A6-1
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
BOILER EMISSIONS CRITERIA POLLUTANTS

		Maximum Emissions Case (100%)	Pollutant Form	Pollutant Class	
PLANT PERFORMANCE:					
Primary Fuel Feed Rate	Tons/hr	538			
Full load Heat input to Boiler	mmBtu/hr	8,710			
PLANT EMISSION ANALYSIS (for two (2) Boilers at the above specifications):					**Emission Rate[2]**
Carbon Monoxide	Short term avg. lb/hr	1,742	Vapor	Inorganic	0.1 lb/mmBtu
	ton/year	7,630			
Nitrogen Oxides	3-hr avg. lb/hr	1,045	Vapor	Inorganic	0.06 lb/mmBtu
	Annual avg. lb/hr	1,045			0.06 lb/mmBtu
	tons/year	4,578			
Particulate Matter (Filterable)[1]	24-hour avg. lb/hr	174.2	Particulate	Inorganic/Organic	0.01 lb/mmBtu
	tons/year	763			
Particulate Matter (Condensable)[1]	24-hour avg. lb/hr	174.2	Particulate	Inorganic/Organic	0.01 lb/mmBtu
	tons/year	763			
Total Particulate Matter[1]	24-hour avg. lb/hr	348.4	Particulate	Inorganic/Organic	0.02 lb/mmBtu
	tons/year	1,526			
Lead	lb/hr	0.5	Particulate	Inorganic	2.59E-05 lb/mmBtu
	tons/year	1.976			
Volatile Organic Compounds	Short term avg. lb/hr	61.0	Vapor	Organic	0.0035 lb/mmBtu
	tons/year	267.0			
Sulfur Dioxide	3-hour avg. lb/hr	1,394	Vapor	Inorganic	0.08 lb/mmBtu
	24-hour avg. lb/hr	1,045			0.06 lb/mmBtu
	30-day avg. lb/hr	1,045			0.06 lb/mmBtu
	tons/year	4,578			
Sulfuric Acid Mist	Short term avg. lb/hr	69.7	Particulate	Organic	0.004 lb/mmBtu
	ton/year	305.2			

STACK PARAMETERS

Stack Flue Gas Temperature	324	K	
Stack Flue Gas Flow Rate	3,382,914	acfm	
Stack Flue Gas Flow Rate	2,246,137	scfm	
Exit Velocity	55	ft/s at 100%	(assume velocity is at actual conditions)
Height	727	ft	
Stack diameter (top ID)	36	ft	(each boiler stack)
Stack top area	1,022.93	ft^2	
Ash Content	13	%	
Heat Content	8100	Btu/lb	
Atmospheric Pressure (Ely, NV)	23.5867	in Hg	

Notes:
1 - Particulate matter less than 10 microns aerodynamic diameter (PM_{10})
2 - Provided by Cummins & Barnard (March 2007), unless otherwise stated. Matches BACT value.
Atmospheric pressure in Ely, NV is 23.5867 in Hg. Source: "Useful Tables for Engineers and Steam Users" 11th Edition 1969 - Babcock and Wilcox Company.

A6-2
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
DIESEL AUXILIARY BOILER EMISSIONS CRITERIA POLLUTANTS

Pollutant	Emission Factor		Source	Hourly Emissions (lb/hr)	Annual Emissions (ton/yr)	Pollutant Form	Pollutant Class
Carbon Monoxide	0.036	lb/mmBtu	BACT - confirmed by C&B	7.92	34.69	Vapor	Inorganic
Nitrogen Oxides	0.1	lb/mmBtu	BACT	22.00	96.36	Vapor	Inorganic
Particulate Matter (Filterable)	0.01	lb/mmBtu	BACT	2.20	9.64	Particulate	Inorganic/ Organic
Particulate Matter (Condensable)	0.01	lb/mmBtu	BACT	2.20	9.64	Particulate	Inorganic/ Organic
Total Particulate Matter[1]	0.02	lb/mmBtu	BACT	4.40	19.27	Particulate	Inorganic/ Organic
Volatile Organic Compounds	0.0018	lb/mmBtu	BACT	0.40	1.73	Vapor	Organic
Sulfur Dioxide	0.05	lb/mmBtu	BACT - confirmed by C&B	11.00	48.18	Vapor	Inorganic

Sulfur Content of Fuel	0.0015%

Description: Emission estimate is based on an auxiliary boiler designed to produce 220 mmBtu/hr. The auxiliary boiler will be fired on diesel fuel.

STACK PARAMETERS

Stack Flue Gas Temperature	350	°F	449.8	K
Stack Flue Gas Flow Rate	69,208	acfm		
Stack Flue Gas Flow Rate	33,129	scfm		
Exit Velocity	59.06	ft/sec	(assume velocity is at actual conditions)	
Height	299.87	ft		
Stack diameter (top ID)	4.99	ft		
Stack area	19.53	ft^2		

Maximum Fuel Firing Rate for the Auxiliary Boiler:	220.0	mmBtu/hr
Heating Value for Diesel Fuel:	140,000	Btu/gal
Maximum Fuel Firing Rate:	1,571.43	gal/hr
Estimated Maximum Annual Hours of Operation:	8,760	hours/year
Atmospheric Pressure (Ely, NV) 23.5867	in Hg	

Notes:

[1]Particulate matter less than 10 microns aerodynamic (PM_{10})

Stack height of Auxiliary Boiler is assumed to be 10 ft above height of boiler buildings

Atmospheric pressure in Ely, NV source: "Useful Tables for Engineers and Steam Users" 11th Edition 1969 - Babcock and Wilcox Company.

A6-3
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
PLANT DIESEL ENGINE AUXILIARY GENERATOR EMISSIONS CRITERIA POLLUTANTS

Pollutant	Emission Factor	Units	Source	Hourly Emissions (lb/hr)	Annual Emissions (ton/yr)	Pollutant Form	Pollutant Class
Carbon Monoxide	3.5	g/kW-hr	40 CFR Part 89	23.1	2.89	Vapor	Inorganic
Nitrogen Oxides	5.6	g/kW-hr	40 CFR Part 89, NOx = 87.5% of total NMHC+NOx	37.0	4.6	Vapor	Inorganic
Total Particulate Matter[1]	0.2	g/kW-hr	40 CFR Part 89	1.3	0.17	Particulate	Inorganic/ Organic
Volatile Organic Compounds	0.8	g/kW-hr	40 CFR Part 89, VOC = 12.5% of total NMHC+NOx	5.3	0.66	Vapor	Organic
Sulfur Dioxide	0.0016	lb/mmBtu	C&B	0.019	0.0024	Vapor	Inorganic

Sulfur Content of Fuel	0.0015%

Description: Emission estimates based on a 3 MW emergency diesel generator using No. 2 fuel oil. Calculations are based on 40 CFR Part 89, Tier 2 limits KW>560, except SO_2 which was calculated by Cummins & Barnard for low sulfur fuel.

STACK PARAMETERS

Stack Flue Gas Temperature	711	K
Flow Rate	56,871	acfm
Flow Rate	17,225	scfm
Exit Velocity	72.2	ft/sec
Height	20.0	ft
Stack diameter (top ID)	27	inch
Stack area	3.98	ft^2

Diesel engine output:	3000	kw	
Diesel engine output:	4650	hp	1hp=2546 Btu/hr
Diesel engine output:	11.84	mmBtu/hr	
Diesel engine input:	138.9	gal/hr	
Diesel engine input:	19.0	mmBtu/hr	
Maximum Annual Hours of Operation:	250	hours/year	
Atmospheric Pressure (Ely, NV)	23.5867	in Hg	

Notes:
[1]Particulate matter less than 10 microns aerodynamic (PM_{10})
Stack temperatures, velocities and fuel usage rates obtained from Caterpillar data sheets.
Stack heights and diameters are based on engineering estimates.
Average heating value of diesel fuel oil is assumed to be 19,300 Btu/lb with a density of 7.1 lb/gal. Based on AP-42 Table 3.4-1.
Atmospheric pressure in Ely, NV source: "Useful Tables for Engineers and Steam Users" 11th Edition 1969 - Babcock and Wilcox Company.

A6-4

SIERRA PACIFIC POWER COMPANY

ELY ENERGY CENTER

DIESEL FIRE WATER PUMP EMISSIONS CRITERIA POLLUTANTS

Pollutant	Emission Factor	Units	Source	Hourly Emissions (lb/hr)	Annual Emissions (ton/yr)	Pollutant Form	Pollutant Class
Carbon Monoxide	2.6	g/hp-hr	Subpart IIII Table 4	4.5	0.564	Vapor	Inorganic
Nitrogen Oxides	4.2	g/hp-hr	Subpart IIII Table 4, NOx = 87.5% of total NMHC+NOx	7.3	0.911	Vapor	Inorganic
Total Particulate Matter[1]	0.15	g/hp-hr	Subpart IIII Table 4	0.3	0.0326	Particulate	Inorganic/ Organic
Volatile Organic Compounds	0.6	g/hp-hr	Subpart IIII Table 4, VOC = 12.5% of total NMHC+NOx	1.0	0.130	Vapor	Organic
Sulfur Dioxide	0.0016	lb/mmBtu	C&B	0.003	0.0004	Vapor	Inorganic

Sulfur Content of Fuel	0.0015%

Description: Emission estimates based on a 787.5 hp emergency diesel fire pump using No. 2 fuel oil. Calculations are based on Federal Register, Vol. 71, No. 132, 40 CFR Subpart IIII, 2009+ KW>560, except SO_2 which was calculated by Cummins & Barnard for low sulfur fuel.

STACK PARAMETERS

Stack Flue Gas Temperature	836	K
Flow Rate	15,970	acfm
Flow Rate	4,111	scfm
Exit Velocity	87.2	ft/sec
Height	10.0	ft
Stack diameter (top ID)	12	inch
Stack area	0.79	ft^2

Diesel engine output:	788	hp	1hp=2546 Btu/hr
Diesel engine output:	2.01	mmBtu/hr	
Diesel engine input:	33	gal/hr	
Diesel engine input:	4.5	mmBtu/hr	
Maximum Annual Hours of Operation:	250	hours/year	
Atmospheric Pressure (Ely, NV)	23.5867	in Hg	

Notes:

[1] Total particulate matter less than 10 microns aerodynamic (PM_{10}). No distribution of filterable versus condensable PM_{10} was available.

Stack temperatures, velocities and fuel usage rates obtained from Caterpillar data sheets.

Stack heights and diameters are based on engineering estimates.

Average heating value of diesel fuel oil is assumed to be 19,300 Btu/lb with a density of 7.1 lb/gal.

Atmospheric pressure in Ely, NV source: "Useful Tables for Engineers and Steam Users" 11th Edition 1969 - Babcock and Wilcox Company.

A6-5

SIERRA PACIFIC POWER COMPANY

ELY ENERGY CENTER

DIESEL BOOSTER FIRE PUMP EMISSIONS CRITERIA POLLUTANTS

Pollutant	Emission Factor	Units	Source	Hourly Emissions (lb/hr)	Annual Emissions (ton/yr)	Pollutant Form	Pollutant Class
Carbon Monoxide	3.7	g/hp-hr	Subpart IIII Table 4	0.7	0.0918	Vapor	Inorganic
Nitrogen Oxides	3.1325	g/hp-hr	Subpart IIII Table 4, NOx = 87.5% of total NMHC+NOx	0.6	0.0777	Vapor	Inorganic
Total Particulate Matter[1]	0.3	g/hp-hr	Subpart IIII Table 4	0.1	0.0074	Particulate	Inorganic/ Organic
Volatile Organic Compounds	0.4375	g/hp-hr	Subpart IIII Table 4, VOC = 12.5% of total NMHC+NOx	0.1	0.0109	Vapor	Organic
Sulfur Dioxide	0.0016	lb/mmBtu	C&B	0.0004	0.00005	Vapor	Inorganic

Sulfur Content of Fuel	0.0015%

Description: Emission estimates based on a 90 hp emergency diesel fire pump using No. 2 fuel oil. Calculations are based on Federal Register, Vol. 71, No. 132, 40 CFR Subpart IIII, 20119+ 56=KW=75, except SO2 which was calculated by Cummins & Barnard for low sulfur fuel.

STACK PARAMETERS

Stack Flue Gas Temperature	308	K
Flow Rate	518	acfm
Flow Rate	362	scfm
Exit Velocity	17.3	ft/sec
Height	10.0	ft
Stack diameter (top ID)	8	inch
Stack area	0.35	ft^2

Diesel engine output:	90	hp	1hp=2546 Btu/hr
Diesel engine output:	0.23	mmBtu/hr	
Diesel engine input:	4.2	gal/hr	
Diesel engine input:	0.6	mmBtu/hr	
Maximum Annual Hours of Operation:	250	hours/year	
Atmospheric Pressure (Ely, NV)	23.5867	in Hg	

Notes:

[1] Total particulate matter less than 10 microns aerodynamic (PM_{10}). No distribution of filterable versus condensable PM_{10} was available.

Stack temperatures, velocities and fuel usage rates obtained from Caterpillar data sheets.

Stack heights and diameters are based on engineering estimates.

Average heating value of diesel fuel oil is assumed to be 19,300 Btu/lb with a density of 7.1 lb/gal.

Atmospheric pressure in Ely, NV source: "Useful Tables for Engineers and Steam Users" 11th Edition 1969 - Babcock and Wilcox Company.

A6-6

SIERRA PACIFIC POWER COMPANY

ELY ENERGY CENTER

LOCOMOTIVE EMISSIONS CRITERIA POLLUTANTS

				Per Engine[1]		Per 3 Engines[1]		Per 6 Engines[1]			
Pollutant	**Emission Factor**	**Units**	**Source**	**Hourly Emissions (lb/hr)**	**Annual Emissions (ton/yr)**	**Hourly Emissions (lb/hr)**	**Annual Emissions (ton/yr)**	**Hourly Emissions (lb/hr)**	**Annual Emissions (ton/yr)**	**Pollutant Form**	**Pollutant Class**
Carbon Monoxide	2.20	g/bhp-hr	USEPA Tier 1 Emission Standards[2]	**1.94**	**8.50**	**5.8**	**25.5**	**11.6**	**51.0**	Vapor	Inorganic
Nitrogen Oxides	7.40	g/bhp-hr	USEPA Tier 1 Emission Standards[2]	**6.53**	**28.58**	**19.6**	**85.7**	**39.2**	**171.5**	Vapor	Inorganic
Total Particulate Matter[3]	0.45	g/bhp-hr	USEPA Tier 1 Emission Standards[2]	**0.40**	**1.74**	**1.2**	**5.2**	**2.4**	**10.4**	Particulate	Inorganic/ Organic
Volatile Organic Compounds	0.55	g/bhp-hr	USEPA Tier 1 Emission Standards[2]	**0.49**	**2.12**	**1.5**	**6.4**	**2.9**	**12.7**	Vapor	Organic
Sulfur Dioxide	0.075	lb/hr	C&B	**0.08**	**0.33**	**0.2**	**1.0**	**0.45**	**2.0**	Vapor	Organic

Sulfur Content of Fuel	0.0015%

STACK PARAMETERS

Stack Flue Gas Temperature	800	°F	700.0	K
Stack Flue Gas Flow Rate	28,611	acfm		
Stack Flue Gas Flow Rate	8,801	scfm	(assume velocity is at standard conditions)	
Exit Velocity	83	ft/sec		
Height	20.0	ft		
Stack diameter (top ID)	18	inch		
Stack area	1.77	ft^2		

Engine Size	4000	hp		C&B
Engine Efficiency	10	%	Idle	C&B
Line-Haul Idle horsepower rating	400	HP		
Diesel engine output:	1.02	mmBtu/hr	1hp=2546 Btu/hr	
Diesel engine input:	34.8	gal/hr		
Diesel engine input:	4.8	mmBtu/hr		
Maximum Annual Hours of Operation:	8760	hours/year		
Atmospheric Pressure (Ely, NV)	23.5867	in Hg		

A6-7

SIERRA PACIFIC POWER COMPANY

ELY ENERGY CENTER

SWITCHYARD DIESEL ENGINE AUXILIARY GENERATOR EMISSIONS CRITERIA POLLUTANTS

Pollutant	Emission Factor	Units	Source	Hourly Emissions (lb/hr)	Annual Emissions (ton/yr)	Pollutant Form	Pollutant Class
Carbon Monoxide	3.5	g/kW-hr	40 CFR Part 89	5.8	0.72	Vapor	Inorganic
Nitrogen Oxides	5.6	g/kW-hr	40 CFR Part 89, NOx = 87.5% of total NMHC+NOx	9.3	1.2	Vapor	Inorganic
Total Particulate Matter[1]	0.2	g/kW-hr	40 CFR Part 89	0.3	0.041	Particulate	Inorganic/ Organic
Volatile Organic Compounds	0.8	g/kW-hr	40 CFR Part 89, VOC = 12.5% of total NMHC+NOx	1.3	0.165	Vapor	Organic
Sulfur Dioxide	0.0016	lb/MMbtu	40 CFR Part 89	0.004	0.0005	Vapor	Inorganic

Sulfur Content of Fuel	0.0015%

Description: Emission estimates based on a 750 kW emergency diesel generator using No. 2 fuel oil. Calculations are based on 40 CFR Part 89, Tier 2 limits KW>560, except SO_2 which was calculated by Cummins & Barnard for low sulfur fuel.

STACK PARAMETERS

Stack Flue Gas Temperature	805	K
Flow Rate	17,901	acfm
Flow Rate	4,786	scfm
Exit Velocity	74.6	ft/sec
Height	20.0	ft
Stack diameter (top ID)	14	inch
Stack area	1.07	ft^2

Diesel engine output:	750	kW	
Diesel engine output:	1013	hp	1hp=2546 Btu/hr
Diesel engine output:	2.58	mmBtu/hr	
Diesel engine input:	37.4	gal/hr	
Diesel engine input:	5.1	mmBtu/hr	
Maximum Annual Hours of Operation:	250	hours/year	
Atmospheric Pressure (Ely, NV)	23.5867	in Hg	

Notes:

[1]Particulate matter less than 10 microns aerodynamic (PM_{10})

Stack temperatures, velocities and fuel usage rates obtained from Caterpillar data sheets.

Stack heights and diameters are based on engineering estimates.

Average heating value of diesel fuel oil is assumed to be 19,300 Btu/lb with a density of 7.1 lb/gal.

A6-8
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
DIESEL SO2 ABSORBER EMERGENCY QUENCH PUMP EMISSIONS CRITERIA POLLUTANTS

Pollutant	Emission Factor	Units	Source	Hourly Emissions (lb/hr)	Annual Emissions (ton/yr)	Pollutant Form	Pollutant Class
Carbon Monoxide	2.6	g/hp-hr	Subpart IIII Table 4	3.9	0.49	Vapor	Inorganic
Nitrogen Oxides	2.625	g/hp-hr	Subpart IIII Table 4, NOx = 87.5% of total NMHC+NOx	3.9	0.5	Vapor	Inorganic
Total Particulate Matter[1]	0.15	g/hp-hr	Subpart IIII Table 4	0.2	0.03	Particulate	Inorganic/ Organic
Volatile Organic Compounds	0.375	g/hp-hr	Subpart IIII Table 4, VOC = 12.5% of total NMHC+NOx	0.6	0.07	Vapor	Organic
Sulfur Dioxide	0.0016	lb/mmBtu	C&B	0.003	0.0003	Vapor	Inorganic

Sulfur Content of Fuel	0.0015%

Description: Emission estimates based on a 682.5 hp emergency diesel fire pump using No. 2 fuel oil. Calculations are based on Federal Register, Vol. 71, No. 132, 40 CFR Subpart IIII, 2009+ 450=KW=560, except SO_2 which was calculated by Cummins & Barnard for low sulfur fuel.

STACK PARAMETERS

Stack Flue Gas Temperature	811	K
Flow Rate	11,675	acfm
Flow Rate	3,100	scfm
Exit Velocity	65.8	ft/sec
Height	10.0	ft
Stack diameter (top ID)	12	inch
Stack area	0.79	ft^2

Diesel engine output:	683	hp	1hp=2546 Btu/hr
Diesel engine output:	1.74	mmBtu/hr	
Diesel engine input:	29.1	gal/hr	
Diesel engine input:	4.0	mmBtu/hr	
Maximum Annual Hours of Operation:	250	hours/year	
Atmospheric Pressure (Ely, NV)	23.5867	in Hg	

Notes:
[1]Particulate matter less than 10 microns aerodynamic (PM_{10})
Stack temperatures, velocities and fuel usage rates obtained from Caterpillar data sheets.
Stack heights and diameters are based on engineering estimates.
Average heating value of diesel fuel oil is assumed to be 19,300 Btu/lb with a density of 7.1 lb/gal.
Atmospheric pressure in Ely, NV source: "Useful Tables for Engineers and Steam Users" 11th Edition 1969 - Babcock and Wilcox Company.

A6-9

SIERRA PACIFIC POWER COMPANY

ELY ENERGY CENTER

PROPANE SPARK AUXILIARY GENERATOR EMISSIONS CRITERIA POLLUTANTS

Pollutant	Emission Factor[2]	Units	Source	Hourly Emissions (lb/hr)	Annual Emissions (ton/yr)	Pollutant Form	Pollutant Class
Carbon Monoxide	0.032	lb/hr	C&B	0.032	0.06	Vapor	Inorganic
Nitrogen Oxides	0.19	lb/hr	C&B	0.19	0.38	Vapor	Inorganic
Filterable Particulate Matter[1]	0.006	lb/hr	C&B	0.006	0.01	Particulate	Inorganic/ Organic
Volatile Organic Compounds	0.005	lb/hr	C&B	0.005	0.01	Vapor	Organic
Sulfur Dioxide	0.015	lb/hr	C&B	0.015	0.03	Vapor	Inorganic

Sulfur Content of Fuel	15.0	gr/100 ft3	C&B

Description:

Emission factors for propane were provided by C&B.

STACK PARAMETERS	(C&B)	
Stack Flue Gas Temperature	901	K
Flow rate	2,069	acfm
Flow rate	494	scfm
Exit Velocity	97.5	ft/sec
Height	4.5	ft
Stack diameter (top ID)	4	inch
Stack area	0.08	ft^2

LPG engine output:	80	hp	60.0	kW
LPG engine output:	0.20	mmBtu/hr	1hp=2546 Btu/hr	
LPG engine input:	260.0	ft^3/hr	0.65	mmBtu/hr
Maximum Annual Hours of Operation:	4000	hours/year		
Atmospheric Pressure (Ely, NV)	23.5867	in Hg		

Notes:

[1]Particulate matter less than 10 microns aerodynamic (PM_{10})

[2] 40 CFR Part 60 Subpart JJJJ, which applies to this unit, is a proposed rule and is not in effect. Should the subpart become a rule, the unit will have to meet certain emission limits, based on its size and type.

Typical heating value commercial-grade propane = 90,500 Btu/gal or 2,500 Btu/ft^3

Atmospheric pressure in Ely, NV source: "Useful Tables for Engineers and Steam Users" 11th Edition 1969 - Babcock and Wilcox Company.

A6-10

SIERRA PACIFIC POWER COMPANY

ELY ENERGY CENTER

COOLING TOWER EMISSIONS CRITERIA POLLUTANTS

Per Unit (2 Units total)

Parameter	Units	Scenario 1	Scenario 2	Scenario 3
Ambient Dry Bulb Temp:	° F	91	44	0
Ambient Wet Bulb Temp:	° F	61	36	-0.76
Number of cells	#	24	24	24
Circulating water flow rate	GPM	250,000	250,000	250,000
Exhaust height	**ft**	**47**	47	47
Exhaust diameter	**ft**	**32.8**	32.8	32.8
Volume flow rate, total	acfm	42,803,760	42,848,858	43,435,471
Volume flow rate, per fan	acfm	1,188,993	1,190,246	1,206,541
Exhaust velocity, per fan	**fps**	**23.45**	23.48	23.80
Exhaust temperature	**F**	84.24	70.55	**52.54**
Assumed Drift Rate	% of Circ rate	0.0005%	0.0005%	0.0005%
Assumed solids content	PPM	10,000	10,000	10,000
Water loss due to drift	gpm	1.25	1.25	1.25
Water density	lb/gal	8.34	8.34	8.34
Pounds of water lost due to drift	lb/min	10.43	10.43	10.43
Pounds solids per pound water	lb/lb	0.01	0.01	0.01
pounds particulate per minute	lb PM/min	0.10	0.10	0.10
pounds per hour - entire tower	lb PM/hr	6.26	6.26	6.26
tpy - entire tower	ton PM/yr	27.40	27.40	27.40
pounds per hour - per cell	**lb PM/hr per cell**	**0.26**	0.26	0.26

A6-11
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **MCD-1**
Source Description: **CAR DUMPER DUST COLLECTOR**
Pollutants: **PM_{10}**

Emission Factor From: **Manufacturer Guarantee**

Explanation: Emissions factor for PM_{10} for the Car Dumper #1 dust collector is stated by the manufacturers guarantee to be 0.005 grains per dry standard cubic foot.

Emissions are calculated by multiplying the emission factor for PM_{10} by the maximum flow rating of the baghouse in standard cubic feet per minute. This yields an emissions rate in grains per minute. To generate a short term emission rate in pounds per hour, the calculated emission rate is multiplied by 60 minutes per hour, which is subsequently divided by 7000 grains per pound. To generate an annual emission rate, the short term emission rate is multiplied by the number of hours of operation per year in which material handling will be performed. This yields an emission rate in pounds per year, which is subsequently divided by 2000 to yield tons per year.

PM_{10} Emission Factor = **0.005** **gr/dscf**
160,000 **scfm**

Short Term Emissions: **PM_{10} in lbs/hr = (baghouse flow rate scfm)*(0.005 gr/dscf)/(7000 gr/lb)*(60 min/hr)**

Annual Emissions: **PM_{10} in tons per year = (Short Term PM_{10})(8760 hr/yr)/(2000 lb/ton)**

Annual PM_{10} EMISSIONS		Short Term	
(TPY)	(g/s)	lb/hr	g/s
30.0	0.864	6.86	0.864

A6-12
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **MCD-2**
Source Description: **Transfer Tower #1 Dust Collector**
Pollutants: **PM10**

Emission Factor From: **Manufacturer Guarantee**

Explanation: Emissions factor for PM10 for the Transfer Tower #1dust collector is stated by the manufacturers guarantee to be 0.005 grains per dry standard cubic foot.

Emissions are calculated by multiplying the emission factor for PM10 by the maximum flow rating of the baghouse in standard cubic feet per minute. This yields an emissions rate in grains per minute. To generate a short term emission rate in pounds per hour, the calculated emission rate is multiplied by 60 minutes per hour, which is subsequently divided by 7000 grains per pound. To generate an annual emission rate, the short term emission rate is multiplied by the number of hours of operation per year in which material handling will be performed. This yields an emission rate in pounds per year, which is subsequently divided by 2000 to yield tons per year.

PM_{10} Emission Factor = **0.005** **gr/dscf**
21,000 **scfm**

Short Term Emissions: **PM_{10} in lbs/hr = (baghouse flow rate scfm)*(0.005 gr/dscf)/(7000 gr/lb)*(60 min/hr)**

Annual Emissions: **PM_{10} in tons per year = (Short Term PM_{10})(8760 hr/yr)/(2000 lb/ton)**

Annual PM_{10} EMISSIONS		Short Term	
(TPY)	(g/s)	lb/hr	g/s
3.94	0.113	0.90	0.113

A6-13
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **MCD-3**
Source Description: **Transfer Tower #2 Dust Collector**
Pollutants: **PM10**

Emission Factor From: **Manufacturer Guarantee**

Explanation: Emissions factor for PM_{10} for Transfer Tower #2 dust collector is stated by the manufacturers guarantee to be 0.005 grains per dry standard cubic foot.

Emissions are calculated by multiplying the emission factor for PM10 by the maximum flow rating of the baghouse in standard cubic feet per minute. This yields an emissions rate in grains per minute. To generate a short term emission rate in pounds per hour, the calculated emission rate is multiplied by 60 minutes per hour, which is subsequently divided by 7000 grains per pound. To generate an annual emission rate, the short term emission rate is multiplied by the number of hours of operation per year in which material handling will be performed. This yields an emission rate in pounds per year, which is subsequently divided by 2000 to yield tons per year.

PM_{10} Emission Factor = **0.005** **gr/dscf**
21,000 **scfm**

Short Term Emissions: **PM_{10} in lbs/hr = (baghouse flow rate scfm)*(0.005 gr/dscf)/(7000 gr/lb)*(60 min/hr)**

Annual Emissions: **PM_{10} in tons per year = (Short Term PM_{10})(8760 hr/yr)/(2000 lb/ton)**

Annual PM_{10} EMISSIONS		Short Term	
(TPY)	(g/s)	lb/hr	g/s
3.94	0.113	0.90	0.113

A6-14
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **MCD-4**
Source Description: **Crusher Building Dust Collector**
Pollutants: **PM10**

Emission Factor From: **Manufacturer Guarantee**

Explanation: Emissions factor for PM_{10} for Crusher House dust collector is stated by the manufacturers guarantee to be 0.005 grains per dry standard cubic foot.

Emissions are calculated by multiplying the emission factor for PM10 by the maximum flow rating of the baghouse in standard cubic feet per minute. This yields an emissions rate in grains per minute. To generate a short term emission rate in pounds per hour, the calculated emission rate is multiplied by 60 minutes per hour, which is subsequently divided by 7000 grains per pound. To generate an annual emission rate, the short term emission rate is multiplied by the number of hours of operation per year in which material handling will be performed. This yields an emission rate in pounds per year, which is subsequently divided by 2000 to yield tons per year.

PM_{10} Emission Factor = **0.005** **gr/dscf**
23,000 **scfm**

Short Term Emissions: **PM_{10} in lbs/hr = (baghouse flow rate scfm)*(0.005 gr/dscf)/(7000 gr/lb)*(60 min/hr)**

Annual Emissions: **PM_{10} in tons per year = (Short Term PM_{10})(8760 hr/yr)/(2000 lb/ton)**

Annual PM_{10} EMISSIONS		Short Term	
(TPY)	(g/s)	lb/hr	g/s
4.32	0.124	0.99	0.124

A6-15
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **MCD-5**
Source Description: **Transfer Tower #3 Dust Collector**
Pollutants: **PM10**

Emission Factor From: **Manufacturer Guarantee**

Explanation: Emissions factor for PM_{10} for Transfer Tower #3 dust collector is stated by the manufacturers guarantee to be 0.005 grains per dry standard cubic foot.

Emissions are calculated by multiplying the emission factor for PM10 by the maximum flow rating of the baghouse in standard cubic feet per minute. This yields an emissions rate in grains per minute. To generate a short term emission rate in pounds per hour, the calculated emission rate is multiplied by 60 minutes per hour, which is subsequently divided by 7000 grains per pound. To generate an annual emission rate, the short term emission rate is multiplied by the number of hours of operation per year in which material handling will be performed. This yields an emission rate in pounds per year, which is subsequently divided by 2000 to yield tons per year.

PM_{10} Emission Factor = **0.005** **gr/dscf**
21,000 **scfm**

Short Term Emissions: **PM_{10} in lbs/hr = (baghouse flow rate scfm)*(0.005 gr/dscf)/(7000 gr/lb)*(60 min/hr)**

Annual Emissions: **PM_{10} in tons per year = (Short Term PM_{10})(8760 hr/yr)/(2000 lb/ton)**

Annual PM_{10} EMISSIONS		Short Term	
(TPY)	(g/s)	lb/hr	g/s
3.94	0.113	0.90	0.113

A6-16
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **CDC-1**
Source Description: **Coal Storage Dome #1 Dust Collector (live storage)**
Pollutants: **PM10**

Emission Factor From: **Manufacturer Guarantee**

Explanation: Emissions factor for PM_{10} for the Coal Storage Dome #1 dust collector is stated by the manufacturers guarantee to be 0.005 grains per dry standard cubic foot.

Emissions are calculated by multiplying the emission factor for PM10 by the maximum flow rating of the baghouse in standard cubic feet per minute. This yields an emissions rate in grains per minute. To generate a short term emission rate in pounds per hour, the calculated emission rate is multiplied by 60 minutes per hour, which is subsequently divided by 7000 grains per pound. To generate an annual emission rate, the short term emission rate is multiplied by the number of hours of operation per year in which material handling will be performed. This yields an emission rate in pounds per year, which is subsequently divided by 2000 to yield tons per year.

PM_{10} Emission Factor = **0.005** **gr/dscf**
150,000 **scfm**

Short Term Emissions: **PM_{10} in lbs/hr = (baghouse flow rate scfm)*(0.005 gr/dscf)/(7000 gr/lb)*(60 min/hr)**

Annual Emissions: **PM_{10} in tons per year = (Short Term PM_{10})(8760 hr/yr)/(2000 lb/ton)**

Annual PM_{10} EMISSIONS		Short Term	
(TPY)	(g/s)	lb/hr	g/s
28.16	0.810	6.43	0.810

A6-17
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **CDC-2**
Source Description: **Coal Storage Dome #2 Dust Collector (live storage)**
Pollutants: **PM10**

Emission Factor From: **Manufacturer Guarantee**

Explanation: Emissions factor for PM_{10} for the Coal Storage Dome #2 dust collector is stated by the manufacturers guarantee to be 0.005 grains per dry standard cubic foot.

Emissions are calculated by multiplying the emission factor for PM10 by the maximum flow rating of the baghouse in standard cubic feet per minute. This yields an emissions rate in grains per minute. To generate a short term emission rate in pounds per hour, the calculated emission rate is multiplied by 60 minutes per hour, which is subsequently divided by 7000 grains per pound. To generate an annual emission rate, the short term emission rate is multiplied by the number of hours of operation per year in which material handling will be performed. This yields an emission rate in pounds per year, which is subsequently divided by 2000 to yield tons per year.

PM_{10} Emission Factor = **0.005** **gr/dscf**
150,000 **scfm**

Short Term Emissions: **PM_{10} in lbs/hr = (baghouse flow rate scfm)*(0.005 gr/dscf)/(7000 gr/lb)*(60 min/hr)**

Annual Emissions: **PM_{10} in tons per year = (Short Term PM_{10})(8760 hr/yr)/(2000 lb/ton)**

Annual PM_{10} EMISSIONS		Short Term	
(TPY)	(g/s)	lb/hr	g/s
28.16	0.810	6.43	0.810

A6-18
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **CDC-3**
Source Description: **Coal Reclaim Conveyor and Tunnel #1 Dust Collector**
Pollutants: **PM10**

Emission Factor From: **Manufacturer Guarantee**

Explanation: Emissions factor for PM10 for the Coal Reclaim Conveyor and Tunnel #1 Dust Collector is stated by the manufacturers guarantee to be 0.005 grains per dry standard cubic foot.

Emissions are calculated by multiplying the emission factor for PM10 by the maximum flow rating of the baghouse in standard cubic feet per minute. This yields an emissions rate in grains per minute. To generate a short term emission rate in pounds per hour, the calculated emission rate is multiplied by 60 minutes per hour, which is subsequently divided by 7000 grains per pound. To generate an annual emission rate, the short term emission rate is multiplied by the number of hours of operation per year in which material handling will be performed. This yields an emission rate in pounds per year, which is subsequently divided by 2000 to yield tons per year.

PM_{10} Emission Factor = **0.005** **gr/dscf**
11,000 **scfm**

Short Term Emissions: **PM_{10} in lbs/hr = (baghouse flow rate scfm)*(0.005 gr/dscf)/(7000 gr/lb)*(60 min/hr)**

Annual Emissions: **PM_{10} in tons per year = (Short Term PM_{10})(8760 hr/yr)/(2000 lb/ton)**

Annual PM_{10} EMISSIONS		Short Term	
(TPY)	(g/s)	lb/hr	g/s
2.06	0.059	0.47	0.059

A6-19
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **CDC-4**
Source Description: **Coal Reclaim Conveyor and Tunnel #2 Dust Collector**
Pollutants: **PM10**

Emission Factor From: **Manufacturer Guarantee**

Explanation: Emissions factor for PM10 for the Coal Reclaim Conveyor and Tunnel #2 Dust Collector is stated by the manufacturers guarantee to be 0.005 grains per dry standard cubic foot.

Emissions are calculated by multiplying the emission factor for PM10 by the maximum flow rating of the baghouse in standard cubic feet per minute. This yields an emissions rate in grains per minute. To generate a short term emission rate in pounds per hour, the calculated emission rate is multiplied by 60 minutes per hour, which is subsequently divided by 7000 grains per pound. To generate an annual emission rate, the short term emission rate is multiplied by the number of hours of operation per year in which material handling will be performed. This yields an emission rate in pounds per year, which is subsequently divided by 2000 to yield tons per year.

PM_{10} Emission Factor = **0.005** **gr/dscf**
11,000 **scfm**

Short Term Emissions: **PM_{10} in lbs/hr = (baghouse flow rate scfm)*(0.005 gr/dscf)/(7000 gr/lb)*(60 min/hr)**

Annual Emissions: **PM_{10} in tons per year = (Short Term PM_{10})(8760 hr/yr)/(2000 lb/ton)**

Annual PM_{10} EMISSIONS		Short Term	
(TPY)	(g/s)	lb/hr	g/s
2.06	0.059	0.47	0.059

A6-20
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **CDC-5**
Source Description: **Coal Tripper Floor Unit #1 Dust Collector A**
Pollutants: **PM10**

Emission Factor From: **Manufacturer Guarantee**

Explanation: Emissions factor for PM_{10} for Unit #1 Tripper Bay Dust Collector A is stated by the manufacturers guarantee to be 0.005 grains per dry standard cubic foot.

Emissions are calculated by multiplying the emission factor for PM10 by the maximum flow rating of the baghouse in standard cubic feet per minute. This yields an emissions rate in grains per minute. To generate a short term emission rate in pounds per hour, the calculated emission rate is multiplied by 60 minutes per hour, which is subsequently divided by 7000 grains per pound. To generate an annual emission rate, the short term emission rate is multiplied by the number of hours of operation per year in which material handling will be performed. This yields an emission rate in pounds per year, which is subsequently divided by 2000 to yield tons per year.

PM_{10} Emission Factor = **0.005** **gr/dscf**
23,000 **scfm**

Short Term Emissions: **PM_{10} in lbs/hr = (baghouse flow rate scfm)*(0.005 gr/dscf)/(7000 gr/lb)*(60 min/hr)**

Annual Emissions: **PM_{10} in tons per year = (Short Term PM_{10})(8760 hr/yr)/(2000 lb/ton)**

Annual PM_{10} EMISSIONS		Short Term	
(TPY)	(g/s)	lb/hr	g/s
4.32	0.124	0.99	0.124

A6-21
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **CDC-6**
Source Description: **Coal Tripper Floor Unit #1 Dust Collector B**
Pollutants: **PM10**

Emission Factor From: **Manufacturer Guarantee**

Explanation: Emissions factor for PM_{10} for Unit #1 Tripper Bay Dust Collector B is stated by the manufacturers guarantee to be 0.005 grains per dry standard cubic foot.

Emissions are calculated by multiplying the emission factor for PM10 by the maximum flow rating of the baghouse in standard cubic feet per minute. This yields an emissions rate in grains per minute. To generate a short term emission rate in pounds per hour, the calculated emission rate is multiplied by 60 minutes per hour, which is subsequently divided by 7000 grains per pound. To generate an annual emission rate, the short term emission rate is multiplied by the number of hours of operation per year in which material handling will be performed. This yields an emission rate in pounds per year, which is subsequently divided by 2000 to yield tons per year.

PM_{10} Emission Factor = **0.005** **gr/dscf**
23,000 **scfm**

Short Term Emissions: **PM_{10} in lbs/hr = (baghouse flow rate scfm)*(0.005 gr/dscf)/(7000 gr/lb)*(60 min/hr)**

Annual Emissions: **PM_{10} in tons per year = (Short Term PM_{10})(8760 hr/yr)/(2000 lb/ton)**

Annual PM_{10} EMISSIONS		Short Term	
(TPY)	(g/s)	lb/hr	g/s
4.32	0.124	0.99	0.124

A6-22
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **CDC-7**
Source Description: **Coal Tripper Floor Unit #2 Dust Collector A**
Pollutants: **PM10**

Emission Factor From: **Manufacturer Guarantee**

Explanation: Emissions factor for PM_{10} for Unit #2 Tripper Bay Dust Collector A is stated by the manufacturers guarantee to be 0.005 grains per dry standard cubic foot.

Emissions are calculated by multiplying the emission factor for PM10 by the maximum flow rating of the baghouse in standard cubic feet per minute. This yields an emissions rate in grains per minute. To generate a short term emission rate in pounds per hour, the calculated emission rate is multiplied by 60 minutes per hour, which is subsequently divided by 7000 grains per pound. To generate an annual emission rate, the short term emission rate is multiplied by the number of hours of operation per year in which material handling will be performed. This yields an emission rate in pounds per year, which is subsequently divided by 2000 to yield tons per year.

PM_{10} Emission Factor = **0.005** **gr/dscf**
23,000 **scfm**

Short Term Emissions: **PM_{10} in lbs/hr = (baghouse flow rate scfm)*(0.005 gr/dscf)/(7000 gr/lb)*(60 min/hr)**

Annual Emissions: **PM_{10} in tons per year = (Short Term PM_{10})(8760 hr/yr)/(2000 lb/ton)**

Annual PM_{10} EMISSIONS		Short Term	
(TPY)	(g/s)	lb/hr	g/s
4.32	0.124	0.99	0.124

A6-23
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **CDC-8**
Source Description: **Coal Tripper Floor Unit #2 Dust Collector B**
Pollutants: **PM10**

Emission Factor From: **Manufacturer Guarantee**

Explanation: Emissions factor for PM_{10} for Unit #2 Tripper Bay Dust Collector B is stated by the manufacturers guarantee to be 0.005 grains per dry standard cubic foot.

Emissions are calculated by multiplying the emission factor for PM10 by the maximum flow rating of the baghouse in standard cubic feet per minute. This yields an emissions rate in grains per minute. To generate a short term emission rate in pounds per hour, the calculated emission rate is multiplied by 60 minutes per hour, which is subsequently divided by 7000 grains per pound. To generate an annual emission rate, the short term emission rate is multiplied by the number of hours of operation per year in which material handling will be performed. This yields an emission rate in pounds per year, which is subsequently divided by 2000 to yield tons per year.

PM_{10} Emission Factor = **0.005** **gr/dscf**
23,000 **scfm**

Short Term Emissions: **PM_{10} in lbs/hr = (baghouse flow rate scfm)*(0.005 gr/dscf)/(7000 gr/lb)*(60 min/hr)**

Annual Emissions: **PM_{10} in tons per year = (Short Term PM_{10})(8760 hr/yr)/(2000 lb/ton)**

Annual PM_{10} EMISSIONS		Short Term	
(TPY)	(g/s)	lb/hr	g/s
4.32	0.124	0.99	0.124

A6-24
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **CH-1**
Source Description: **Coal Unloading Belt Feeder Transfer Point**
Pollutants: **PM_{10}**

Emission Factor From: **AP-42, Section 13.2.4**
"Aggregate Handling and Storage Piles"

Emission Factor Rating: **A**

Explanation: The emissions factor for PM_{10} for the coal unloading belt feeder is calculated by using the predictive emission equation specified in Section 13.2.4, Equation (1) in units of pounds per ton. This equation states that the emissions factor of PM_{10} can be calculated by multiplying the Aerodynamic Particle Size Multiplier of 0.35 (for PM_{10}) by 0.0032. This result is multiplied by the quantity of the mean wind speed divided by 5 and raised to the power of 1.3, with this quantity divided by the quantity of the material moisture content divided by 2 and raised to the power of 1.4. The product of the multiplication specified by Equation (1) is the emission factor in pounds per ton of material processed in a batch drop operation.

The mean wind speed used was the average wind speed for the 1986 - 1990 period for the Ely, NV meteorological station.

Emissions are calculated by multiplying the emission factor for PM10 by the amount of coal loaded per hour, multiplied by 1 minus the control efficiency in percentage. This yields a short term emission rate in pounds per hour. To generate an annual emission rate, the calculated emission rate is multiplied by the number of hours of operation per year in which material handling will be performed. This yields an emission rate in pounds per year, which is subsequently divided by 2000 to yield tons per year.

Emission Equations:

$$E = k*0.0032*[((U/5)^{1.3})/((M/2)^{1.4})] \quad \text{lbs/ton} \quad \text{Equation (1)}$$

$$PM_{10}\ \text{emissions} = E*(\text{coal loaded})*(1-C) \quad \text{lb/hr} \quad \text{Equation (2)}$$

Where:
E is the emission factor
k is the Aerodynamic Particle Size Multiplier (dimensionless)
U is the mean wind speed in mile per hour
M is the material moisture content in percent

Data:

U =	**2.00**	**mph; set to account for underground conditions**
M =	**27**	**% - material moisture content**
k =	**0.35**	**Aerodynamic Particle Size Multiplier**
C =	**100%**	**- controlled via dust collector associated with MDC-1**

PM_{10} Emission Factor = **0.0000089 lbs/ton**
4000 tons/hr

Short Term Emissions: **PM_{10} in lbs/hr =**
(0.35)*(0.0032)*[((9.8/5)1.3)/((29/2)1.4)]*(tons coal loaded per hour)*(1-1.00)

Annual Emissions: **PM_{10} in tons per year =**
(0.35)*(0.0032)*[((9.8/5)1.3)/((29/2)1.4)]*[(tons coal loaded per hour)*(8760 hr/yr)/(2000 lb/ton)]*(1-1.00)

Annual PM_{10} EMISSIONS		Short Term		
(TPY)	(g/s)	lb/hr	g/s	
0.000	0.00000	0.0000	0.00000	Emissions controlled via MDC-1

A6-25
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **CH-2**
Source Description: **Coal Stockout Conveyor**
Pollutants: **PM_{10}**

Emission Factor From: **AP-42, Section 13.2.4**
"Aggregate Handling and Storage Piles"

Emission Factor Rating: **A**

Explanation: The emissions factor for PM_{10} for coal stockout is calculated by using the predictive emission equation specified in Section 13.2.4, Equation (1) in units of pounds per ton. This equation states that the emissions factor of PM_{10} can be calculated by multiplying the Aerodynamic Particle Size Multiplier of 0.35 (for PM_{10}) by 0.0032. This result is multiplied by the quantity of the mean wind speed divided by 5 and raised to the power of 1.3, with this quantity divided by the quantity of the material moisture content divided by 2 and raised to the power of 1.4. The product of the multiplication specified by Equation (1) is the emission factor in pounds per ton of material processed in a batch drop operation.

The mean wind speed used was the average wind speed for the 1986 - 1990 period for the Ely, NV meteorological station.

Emissions are calculated by multiplying the emission factor for PM_{10} by the amount of coal loaded per hour, multiplied by 1 minus the control efficiency in percentage. This yields a short term emission rate in pounds per hour. To generate an annual emission rate, the calculated emission rate is multiplied by the number of hours of operation per year in which material handling will be performed. This yields an emission rate in pounds per year, which is subsequently divided by 2000 to yield tons per year.

Emission Equations:

$$E = k*0.0032*[((U/5)^{1.3})/((M/2)^{1.4})] \quad \text{lb/ton} \quad \text{Equation (1)}$$

$$PM_{10}\ \text{emissions} = E*(\text{coal loaded})*(1-C) \quad \text{lb/hr} \quad \text{Equation (2)}$$

Where:
E is the emission factor
k is the Aerodynamic Particle Size Multiplier (dimensionless)
U is the mean wind speed in mile per hour
M is the material moisture content in percent

Data:
U = 9.80 mph - 1989 - 1990 Ely, NV mean wind speed
M = 27 % - material moisture content
k = 0.35 Aerodynamic Particle Size Multiplier
C = 75% - control efficiency for telescoping chute

PM_{10} Emission Factor = 0.0000703 lbs/ton
4000 tons/hr

Short Term Emissions: **PM_{10} in lbs/hr =**
(0.35)*(0.0032)*[((9.8/5)1.3)/((27/2)1.4)]*(tons coal loaded per hour)*(1-0.75)

Annual Emissions: **PM_{10} in tons per year =**
(0.35)*(0.0032)*[((9.8/5)1.3)/((29/2)1.4)]*[(tons coal loaded per hour)*(8760 hr/yr)/(2000 lb/ton)]*(1-0.75)

Annual PM_{10} EMISSIONS		Short Term	
(TPY)	(g/s)	lb/hr	g/s
0.308	0.0089	0.070	0.0089

A6-26
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **CH-3**
Source Description: **Active Coal Pile Wind Erosion and Maintenance**
Pollutants: **PM_{10}**

Emission Factor From: **AP-42, TABLE 11.9-1**
"Emission Factor Equations for Uncontrolled Open Dust Sources at Western Surface Coal Mines"
AP-42, Section 13.2.4
"Aggregate Handling and Storage Piles"

Emission Factor Rating: **C** **(Rating applicable to N.W. CO, S.W. CO, and N.E. WY surface sub-bituminous coal mines)**

Explanation: Emissions for PM_{10} from active storage pile wind erosion and maintenance is calculated from the emission factor for Total Suspended Particulate (TSP) provided in Table 11.9-1 and multiplying that value by the average wind speed and the Aerodynamic Particle Size Multiplier for PM_{10} from Section 13.2.4.

The mean wind speed used was the average wind speed for the 1986 - 1990 period for the Ely, NV meteorological station. This multiplication yields an emission rate in pounds per acre-hour.

Emissions are calculated by multiplying the emission factor for PM_{10} by the total acreage of the area of disturbance, multiplied by 1 minus the control efficiency in percentage. This yields a short term emission rate in pounds per hour. To generate an annual emission rate, the calculated emission rate is multiplied by the number of hours of operation per year in which material handling will be performed. This yields an emission rate in pounds per year, which is subsequently divided by 2000 to yield tons per year.

Emission Equations:

TSP:	**E = 0.72*u**	**lbs/acre-hr**
PM_{10}:	**E = 0.72*u*k**	**lbs/acre-hr**

Where: E is the emission factor
u is the average wind speed (mph)

Data:

u =	**9.8**	**mph - 1989 - 1990 Ely, NV mean wind speed**
k =	**0.35**	**Aerodynamic Particle Size Multiplier for PM_{10}**
C =	**75%**	**control efficiency assumed**
A =	**3.15**	**total acreage of area of disturbance**

Short Term Emissions: **PM_{10} in lbs/hr = (0.72)*(9.8 mph)*(0.35)*(total acreage disturbed)*(1-0.90)**

Annual Emissions: **PM_{10} in tons per year = (Short Term PM_{10})(8760 hr/yr)/(2000 lb/ton)**

Annual PM_{10} EMISSIONS		Short Term	
TPY	**g/s**	**lb/hr**	**g/s**
8.51	2.45E-01	1.94	2.45E-01

A6-27
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **CH-4**
Emission Source: **INACTIVE COAL PILE WIND EROSION**
Pollutants: **PM_{10}**

Emission Factor From: **AP-42, Section 13.2.5**
"Industrial Wind Erosion"

Emission Factor Rating: **NA**

Explanation: Emissions for PM_{10} from wind erosion of undisturbed area sources is calculated based on the Predictive Emission Factor Equation (Equation 2 in AP-42, Section 13.2.5). This equation relies on the calculation of the erosion potential function for a dry, exposed surface, which in turn relies on the estimation of friction velocity and threshold friction velocity of the disturbed surface. Friction velocity is calculated based on the fastest mile of the reference anemometer for the period between disturbances. The series of required calculations are shown below.

This multiplication yields an emission rate in grams per square meter.

Emission Equations: **PM_{10}:** $E = k*N*P$ **(g/m^2)**

Where:
E is the emission factor
k is the Aerodynamic Particle Size Multiplier (dimensionless)
N is the number of disturbances per year
P is the erosion potential corresponding to the observed fastest mile of wind for the period between disturbances (calculated)

Data:
k = 0.5 Aerodynamic Particle Size Multiplier for PM < 10 mm
N = 1 One disturbance per year assumed for short term modeling

$$P = 58 (u^* - u_t^*)^{2} + 25(u^* - u_t^*)$$

Where:
P is the erosion potential corresponding to the observed fastest mile of wind for the period between disturbances
u* is the friction velocity (calculated)
u_t* is the threshold velocity found in AP-42, Table 13.2.5-2

Data:
u_t* = 1.12 Threshold Friction Velocity (m/s) in AP-42 Table 13.2.5-2 for "Uncrusted coal pile"

$$u^* = 0.10*u_s/u_r*u_{10}$$

Where:
u* is the friction velocity
us/ur is the ratio of surface wind speed to approach wind speed, and is conservatively assumed to equal 0.6 for the entire pile (ref. Figure 13.2.5-2)
u_{10} is the fastest mile of reference anemometer for period between disturbances (calculated) (m/s)

$$u_{10} = u * (\ln(10/0.005)/\ln(H_{an}/0.005))$$

Data:
u = 18.6 Fastest mile at the Ely, NV meteorological station for the period 1986 - 1990 (m/s)
H_{an} = 6.1 Anemometer height (m)

A6-27
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Calculated Values

u_{10} = 19.9 (m/s)
u* = 1.20 (m/s)
P = 2.22 (g/m^2)
E = 1.11 ($g/m^2/yr$)

Data:

A = 185800.0 undisturbed, exposed area (m^2)
C = 50.0% percent control efficiency for compaction

Short Term Emissions: PM_{10} in lbs/hr = (1.11)*(total undisturbed area)*(1-0.90)

Annual Emissions: PM_{10} in tons per year = (Short Term PM_{10})(8760 hr/yr)/(2000 lb/ton)

Annual PM_{10} EMISSIONS		Short Term	
TPY	g/s	lb/hr	g/s
0.11	3.27E-03	0.026	3.27E-03

A6-28
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **LDC-1**
Source Description: **Limestone Preparation Building Dust Collector**
Pollutants: **PM10**

Emission Factor From: **Manufacturer Guarantee**

Explanation: Emissions factor for PM10 for the Limestone Preparation Building dust collector is stated by the manufacturers guarantee to be 0.005 grains per dry standard cubic foot.

Emissions are calculated by multiplying the emission factor for PM10 by the maximum flow rating of the baghouse in standard cubic feet per minute. This yields an emissions rate in grains per minute. To generate a short term emission rate in pounds per hour, the calculated emission rate is multiplied by 60 minutes per hour, which is subsequently divided by 7000 grains per pound. To generate an annual emission rate, the short term emission rate is multiplied by the number of hours of operation per year in which material handling will be performed. This yields an emission rate in pounds per year, which is subsequently divided by 2000 to yield tons per year.

PM_{10} Emission Factor = **0.005** **gr/dscf**
4,000 **scfm**

Short Term Emissions: **PM_{10} in lbs/hr = (baghouse flow rate scfm)*(0.005 gr/dscf)/(7000 gr/lb)*(60 min/hr)**

Annual Emissions: **PM_{10} in tons per year = (Short Term PM_{10})(8760 hr/yr)/(2000 lb/ton)**

Annual PM_{10} EMISSIONS		Short Term	
(TPY)	(g/s)	lb/hr	g/s
0.751	0.0215996	0.171	0.021600

A6-29
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **LDC-2**
Source Description: **Limestone Silo A Dust Collector**
Pollutants: **PM10**

Emission Factor From: **Manufacturer Guarantee**

Explanation: Emissions factor for PM10 for the Limestone Silo A dust collector is stated by the manufacturers guarantee to be 0.01 grains per dry standard cubic foot.

Emissions are calculated by multiplying the emission factor for PM10 by the maximum flow rating of the baghouse in standard cubic feet per minute. This yields an emissions rate in grains per minute. To generate a short term emission rate in pounds per hour, the calculated emission rate is multiplied by 60 minutes per hour, which is subsequently divided by 7000 grains per pound. To generate an annual emission rate, the short term emission rate is multiplied by the number of hours of operation per year in which material handling will be performed. This yields an emission rate in pounds per year, which is subsequently divided by 2000 to yield tons per year.

PM_{10} Emission Factor = **0.01** **gr/dscf**
700 **scfm**

Short Term Emissions: **PM_{10} in lbs/hr = (baghouse flow rate scfm)*(0.01 gr/dscf)/(7000 gr/lb)*(60 min/hr)**

Annual Emissions: **PM_{10} in tons per year = (Short Term PM_{10})(8760 hr/yr)/(2000 lb/ton)**

Annual PM_{10} EMISSIONS		Short Term	
(TPY)	(g/s)	lb/hr	g/s
0.263	0.0075599	0.060	0.007560

A6-30
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **LDC-3**
Source Description: **Limestone Silo B Dust Collector**
Pollutants: **PM10**

Emission Factor From: **Manufacturer Guarantee**

Explanation: Emissions factor for PM10 for the Limestone Silo B dust collector is stated by the manufacturers guarantee to be 0.01 grains per dry standard cubic foot.

Emissions are calculated by multiplying the emission factor for PM10 by the maximum flow rating of the baghouse in standard cubic feet per minute. This yields an emissions rate in grains per minute. To generate a short term emission rate in pounds per hour, the calculated emission rate is multiplied by 60 minutes per hour, which is subsequently divided by 7000 grains per pound. To generate an annual emission rate, the short term emission rate is multiplied by the number of hours of operation per year in which material handling will be performed. This yields an emission rate in pounds per year, which is subsequently divided by 2000 to yield tons per year.

PM_{10} Emission Factor = **0.01** **gr/dscf**
700 **scfm**

Short Term Emissions: **PM_{10} in lbs/hr = (baghouse flow rate scfm)*(0.01 gr/dscf)/(7000 gr/lb)*(60 min/hr)**

Annual Emissions: **PM_{10} in tons per year = (Short Term PM_{10})(8760 hr/yr)/(2000 lb/ton)**

Annual PM_{10} EMISSIONS		Short Term	
(TPY)	(g/s)	lb/hr	g/s
0.263	0.0075599	0.060	0.007560

A6-31
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **LDC-4**
Source Description: **Limestone Reclaim Tunnel Dust Collector**
Pollutants: **PM10**

Emission Factor From: **Manufacturer Guarantee**

Explanation: Emissions factor for PM10 for the Limestone Reclaim Tunnel dust collector is stated by the manufacturers guarantee to be 0.005 grains per dry standard cubic foot.

Emissions are calculated by multiplying the emission factor for PM10 by the maximum flow rating of the baghouse in standard cubic feet per minute. This yields an emissions rate in grains per minute. To generate a short term emission rate in pounds per hour, the calculated emission rate is multiplied by 60 minutes per hour, which is subsequently divided by 7000 grains per pound. To generate an annual emission rate, the short term emission rate is multiplied by the number of hours of operation per year in which material handling will be performed. This yields an emission rate in pounds per year, which is subsequently divided by 2000 to yield tons per year.

PM_{10} Emission Factor = **0.005** **gr/dscf**
4,125 **scfm**

Short Term Emissions: **PM_{10} in lbs/hr = (baghouse flow rate scfm)*(0.005 gr/dscf)/(7000 gr/lb)*(60 min/hr)**

Annual Emissions: **PM_{10} in tons per year = (Short Term PM_{10})(8760 hr/yr)/(2000 lb/ton)**

Annual PM_{10} EMISSIONS		Short Term	
(TPY)	(g/s)	lb/hr	g/s
0.774	0.0222746	0.177	0.022275

A6-32
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **LDC-5**
Source Description: **Limestone Unloading Building Dust Collector**
Pollutants: **PM10**

Emission Factor From: **Manufacturer Guarantee**

Explanation: Emissions factor for PM10 for the Limestone Unloading Building dust collector is stated by the manufacturers guarantee to be 0.005 grains per dry standard cubic foot.

Emissions are calculated by multiplying the emission factor for PM10 by the maximum flow rating of the baghouse in standard cubic feet per minute. This yields an emissions rate in grains per minute. To generate a short term emission rate in pounds per hour, the calculated emission rate is multiplied by 60 minutes per hour, which is subsequently divided by 7000 grains per pound. To generate an annual emission rate, the short term emission rate is multiplied by the number of hours of operation per year in which material handling will be performed. This yields an emission rate in pounds per year, which is subsequently divided by 2000 to yield tons per year.

PM_{10} Emission Factor = **0.005** **gr/dscf**
75,000 **scfm**

Short Term Emissions: **PM_{10} in lbs/hr = (baghouse flow rate scfm)*(0.01 gr/dscf)/(7000 gr/lb)*(60 min/hr)**

Annual Emissions: **PM_{10} in tons per year = (Short Term PM_{10})(8760 hr/yr)/(2000 lb/ton)**

Annual PM_{10} EMISSIONS		Short Term	
(TPY)	(g/s)	lb/hr	g/s
14.079	0.4049932	3.214	0.405000

A6-33
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **LH-1**
Source Description: **Limestone Unloading Conveyor Transfer Point**
Pollutants: **PM_{10}**

Emission Factor From: **AP-42, Section 13.2.4**
"Aggregate Handling and Storage Piles"

Emission Factor Rating: **A**

Explanation:

The emissions factor for PM_{10} for limestone unloading conveyor is calculated by using the predictive emission equation specified in Section 13.2.4, Equation (1) in units of pounds per ton. This equation states that emissions factor of PM10 can be calculated by multiplying the Aerodynamic Particle Size Multiplier provided in the text by 0.0032. This result is multiplied by the quantity of the mean wind speed divided by 5 and raised to the power of 1.3, with this quantity divided by the quantity of the material moisture content divided by 2 and raised to the power of 1.4. The product of the multiplication specified by Equation (1) is the emission factor in pounds per ton of material processed in a batch drop operation.

The mean wind speed used was the site specific mean wind speed.

Emissions are calculated by multiplying the emission factor for PM10 by the amount of limestone loaded per hour, multiplied by 1 minus the control efficiency in percentage. This yields a short term emission rate in pounds per hour. To generate an annual emission rate, the calculated emission rate is multiplied by the number of hours of operation per year in which material handling will be performed. This yields an emission rate in pounds per year, which is subsequently divided by 2000 to yield tons per year.

Emission Equations:

$$E = k*0.0032*[((U/5)^{1.3})/((M/2)^{1.4})] \quad \text{lbs/ton} \quad \text{Equation (1)}$$

$$PM_{10}\ \text{emissions} = E*(\text{coal loaded})*(1-C) \quad \text{lb/hr} \quad \text{Equation (2)}$$

Where:
E is the emission factor
k is the Aerodynamic Particle Size Multiplier (dimensionless)
U is the mean wind speed in mile per hour
M is the material moisture content in percent

Data:

U =	**9.80**	**mph - mean wind speed**
M =	**4.00**	**% - material moisture content**
k =	**0.35**	**Aerodynamic Particle Size Multiplier**
C =	**80%**	**- control efficiency for fines screening in lowering well**

PM_{10} Emission Factor = **0.001** **lbs/ton**
600 **tons/hr**

Short Term Emissions: **PM_{10} in lbs/hr =**
(0.35)(0.0032)[((9.8/5)1.3)/((4/2)1.4)](tons limestone loaded per hour)(1-0.80)

Annual Emissions: **PM_{10} in tons per year =**
(0.35)(0.0032)[((9.8/5)1.3)/((4/2)1.4)][(tons limestone loaded per hour)(8760 hr/yr)/(2000 lb/ton)](1-0.80)

Annual PM_{10} EMISSIONS		Short Term	
(TPY)	(g/s)	lb/hr	g/s
0.535	0.0153905	0.122	0.015391

A6-34
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **LH-2**
Source Description: **Limestone Silo A Loading Conveyor Transfer Point**
Pollutants: **PM_{10}**

Emission Factor From: **AP-42, Section 13.2.4**
"Aggregate Handling and Storage Piles"

Emission Factor Rating: **A**

Explanation: The emissions factor for PM_{10} for limestone silo A loading conveyor transfer point is calculated by using the predictive emission equation specified in Section 13.2.4, Equation (1) in units of pounds per ton. This equation states that emissions factor of PM10 can be calculated by multiplying the Aerodynamic Particle Size Multiplier provided in the text by 0.0032. This result is multiplied by the quantity of the mean wind speed divided by 5 and raised to the power of 1.3, with this quantity divided by the quantity of the material moisture content divided by 2 and raised to the power of 1.4. The product of the multiplication specified by Equation (1) is the emission factor in pounds per ton of material processed in a batch drop operation.

The mean wind speed used was the site specific mean wind speed.

Emissions are calculated by multiplying the emission factor for PM10 by the amount of limestone loaded per hour, multiplied by 1 minus the control efficiency in percentage. This yields a short term emission rate in pounds per hour. To generate an annual emission rate, the calculated emission rate is multiplied by the number of hours of operation per year in which material handling will be performed. This yields an emission rate in pounds per year, which is subsequently divided by 2000 to yield tons per year.

Emission Equations:

$$E = k*0.0032*[((U/5)^{1.3})/((M/2)^{1.4})] \quad \text{lbs/ton} \quad \text{Equation (1)}$$

$$PM_{10}\ \text{emissions} = E*(\text{coal loaded})*(1-C) \quad \text{lb/hr} \quad \text{Equation (2)}$$

Where:
E is the emission factor
k is the Aerodynamic Particle Size Multiplier (dimensionless)
U is the mean wind speed in mile per hour
M is the material moisture content in percent

Data:

U =	**2.00**	**mph - mean wind speed for enclosed conditions**
M =	**4.00**	**% - material moisture content**
k =	**0.35**	**Aerodynamic Particle Size Multiplier**
C =	**50%**	**- control efficiency for enclosure**

PM_{10} Emission Factor = **0.0001** **lbs/ton**
600 **tons/hr**

Short Term Emissions: **PM_{10} in lbs/hr =**
(0.35)(0.0032)[((9.8/5)1.3)/((4/2)1.4)](tons limestone loaded per hour)(1-0.50)

Annual Emissions: **PM_{10} in tons per year =**
(0.35)(0.0032)[((9.8/5)1.3)/((4/2)1.4)][(tons limestone loaded per hour)(8760 hr/yr)/(2000 lb/ton)](1-0.50)

Annual PM_{10} EMISSIONS		Short Term	
(TPY)	(g/s)	lb/hr	g/s
0.169	0.0048746	0.039	0.004875

A6-35
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **LH-3**
Source Description: **Limestone Silo B Loading Conveyor Transfer Point**
Pollutants: **PM_{10}**

Emission Factor From: **AP-42, Section 13.2.4**
"Aggregate Handling and Storage Piles"

Emission Factor Rating: **A**

Explanation: The emissions factor for PM_{10} for limestone silo B loading conveyor transfer point is calculated by using the predictive emission equation specified in Section 13.2.4, Equation (1) in units of pounds per ton. This equation states that emissions factor of PM10 can be calculated by multiplying the Aerodynamic Particle Size Multiplier provided in the text by 0.0032. This result is multiplied by the quantity of the mean wind speed divided by 5 and raised to the power of 1.3, with this quantity divided by the quantity of the material moisture content divided by 2 and raised to the power of 1.4. The product of the multiplication specified by Equation (1) is the emission factor in pounds per ton of material processed in a batch drop operation.

The mean wind speed used was the site specific mean wind speed.

Emissions are calculated by multiplying the emission factor for PM10 by the amount of limestone loaded per hour, multiplied by 1 minus the control efficiency in percentage. This yields a short term emission rate in pounds per hour. To generate an annual emission rate, the calculated emission rate is multiplied by the number of hours of operation per year in which material handling will be performed. This yields an emission rate in pounds per year, which is subsequently divided by 2000 to yield tons per year.

Emission Equations:

$$E = k*0.0032*[((U/5)^{1.3})/((M/2)^{1.4})] \quad \text{lbs/ton} \quad \text{Equation (1)}$$

$$PM_{10}\ \text{emissions} = E*(\text{coal loaded})*(1-C) \quad \text{lb/hr} \quad \text{Equation (2)}$$

Where:
E is the emission factor
k is the Aerodynamic Particle Size Multiplier (dimensionless)
U is the mean wind speed in mile per hour
M is the material moisture content in percent

Data:

U =	**2.00**	**mph - mean wind speed for enclosed conditions**
M =	**4.00**	**% - material moisture content**
k =	**0.35**	**Aerodynamic Particle Size Multiplier**
C =	**50%**	**- control efficiency for enclosure**

PM_{10} Emission Factor = **0.000** **lbs/ton**
600 **tons/hr**

Short Term Emissions: **PM_{10} in lbs/hr =**
(0.35)(0.0032)[((9.8/5)1.3)/((4/2)1.4)](tons limestone loaded per hour)(1-0.50)

Annual Emissions: **PM_{10} in tons per year =**
(0.35)(0.0032)[((9.8/5)1.3)/((4/2)1.4)][(tons limestone loaded per hour)(8760 hr/yr)/(2000 lb/ton)](1-0.50)

Annual PM_{10} EMISSIONS		Short Term	
(TPY)	(g/s)	lb/hr	g/s
0.169	0.0048746	0.039	0.004875

A6-36
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **LH-4**
Source Description: **Limestone Pile Wind Erosion and Maintenance**
Pollutants: **PM_{10}**

Emission Factor From: **AP-42, TABLE 11.9-1**
"Emission Factor Equations for Uncontrolled Open Dust Sources at Western Surface Coal Mines"
AP-42, Section 13.2.4
"Aggregate Handling and Storage Piles"

Emission Factor Rating: **C** **(Rating applicable to N.W. CO, S.W. CO, and N.E. WY surface sub-bituminous coal mines)**

Explanation: Emissions for PM_{10} from active storage pile wind erosion and maintenance is calculated from the emission factor for Total Suspended Particulate (TSP) provided in Table 11.9-1 and multiplying that value by the average wind speed and the Aerodynamic Particle Size Multiplier for PM_{10} from Section 13.2.4.

The mean wind speed used was the average wind speed for the 1986 - 1990 period for the Ely, NV meteorological station. This multiplication yields an emission rate in pounds per acre-hour.

Emissions are calculated by multiplying the emission factor for PM10 by the total acreage of the area of disturbance, multiplied by 1 minus the control efficiency in percentage. This yields a short term emission rate in pounds per hour. To generate an annual emission rate, the calculated emission rate is multiplied by the number of hours of operation per year in which material handling will be performed. This yields an emission rate in pounds per year, which is subsequently divided by 2000 to yield tons per year.

Emission Equations:

TSP:	**$E = 0.72*u$**	**lbs/acre-hr**
PM_{10}:	**$E = 0.72*u*k$**	**lbs/acre-hr**

Where: E is the emission factor
u is the average wind speed (mph)

Data:

u =	**9.8**	**mph - 1989 - 1990 Ely, NV mean wind speed**
k =	**0.35**	**Aerodynamic Particle Size Multiplier for PM_{10}**
C =	**0%**	**no control efficiency assumed**
A =	**0.56**	**total acreage of area of disturbance**

Short Term Emissions: **PM_{10} in lbs/hr = (0.72)*(9.8 mph)*(0.35)*(total acreage disturbed)*(1-0.0)**

Annual Emissions: **PM_{10} in tons per year = (Short Term PM_{10})(8760 hr/yr)/(2000 lb/ton)**

Annual PM_{10} EMISSIONS		Short Term	
TPY	**g/s**	**lb/hr**	**g/s**
6.07	1.75E-01	1.39	1.75E-01

A6-37
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **ACD-1**
Source Description: **Fly Ash Silo #1 Dust Collector**
Pollutants: **PM10**

Emission Factor From: **Manufacturer Guarantee**

Explanation: Emissions factor for PM10 for the Fly Ash Silo #1dust collector is stated by the manufacturers guarantee to be 0.01 grains per dry standard cubic foot.

Emissions are calculated by multiplying the emission factor for PM10 by the maximum flow rating of the baghouse in standard cubic feet per minute. This yields an emissions rate in grains per minute. To generate a short term emission rate in pounds per hour, the calculated emission rate is multiplied by 60 minutes per hour, which is subsequently divided by 7000 grains per pound. To generate an annual emission rate, the short term emission rate is multiplied by the number of hours of operation per year in which material handling will be performed. This yields an emission rate in pounds per year, which is subsequently divided by 2000 to yield tons per year.

PM_{10} Emission Factor = **0.01** **gr/dscf**
1,000 **scfm**

Short Term Emissions: **PM_{10} in lbs/hr = (baghouse flow rate scfm)*(0.01 gr/dscf)/(7000 gr/lb)*(60 min/hr)**

Annual Emissions: **PM_{10} in tons per year = (Short Term PM_{10})(8760 hr/yr)/(2000 lb/ton)**

Annual PM_{10} EMISSIONS		Short Term	
(TPY)	(g/s)	lb/hr	g/s
0.375	0.0107998	0.086	0.010800

A6-38
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **ACD-2**
Source Description: **Fly Ash Silo #2 Dust Collector**
Pollutants: **PM10**

Emission Factor From: **Manufacturer Guarantee**

Explanation: Emissions factor for PM10 for the Fly Ash Silo #2 dust collector is stated by the manufacturers guarantee to be 0.01 grains per dry standard cubic foot.

Emissions are calculated by multiplying the emission factor for PM10 by the maximum flow rating of the baghouse in standard cubic feet per minute. This yields an emissions rate in grains per minute. To generate a short term emission rate in pounds per hour, the calculated emission rate is multiplied by 60 minutes per hour, which is subsequently divided by 7000 grains per pound. To generate an annual emission rate, the short term emission rate is multiplied by the number of hours of operation per year in which material handling will be performed. This yields an emission rate in pounds per year, which is subsequently divided by 2000 to yield tons per year.

PM_{10} Emission Factor = **0.01** **gr/dscf**
1,000 **scfm**

Short Term Emissions: **PM_{10} in lbs/hr = (baghouse flow rate scfm)*(0.01 gr/dscf)/(7000 gr/lb)*(60 min/hr)**

Annual Emissions: **PM_{10} in tons per year = (Short Term PM_{10})(8760 hr/yr)/(2000 lb/ton)**

Annual PM_{10} EMISSIONS		Short Term	
(TPY)	(g/s)	lb/hr	g/s
0.375	0.0107998	0.086	0.010800

A6-39
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **ACD-3**
Source Description: **Bottom Ash Silo 1 Dust Collector**
Pollutants: **PM10**

Emission Factor From: **Manufacturer Guarantee**

Explanation: Emissions factor for PM10 for the Bottom Ash Silo 1 dust collector is stated by the manufacturers guarantee to be 0.01 grains per dry standard cubic foot.

Emissions are calculated by multiplying the emission factor for PM10 by the maximum flow rating of the baghouse in standard cubic feet per minute. This yields an emissions rate in grains per minute. To generate a short term emission rate in pounds per hour, the calculated emission rate is multiplied by 60 minutes per hour, which is subsequently divided by 7000 grains per pound. To generate an annual emission rate, the short term emission rate is multiplied by the number of hours of operation per year in which material handling will be performed. This yields an emission rate in pounds per year, which is subsequently divided by 2000 to yield tons per year.

PM_{10} Emission Factor = **0.01** **gr/dscf**
1,000 **scfm**

Short Term Emissions: **PM_{10} in lbs/hr = (baghouse flow rate scfm)*(0.01 gr/dscf)/(7000 gr/lb)*(60 min/hr)**

Annual Emissions: **PM_{10} in tons per year = (Short Term PM_{10})(8760 hr/yr)/(2000 lb/ton)**

Annual PM_{10} EMISSIONS		Short Term	
(TPY)	(g/s)	lb/hr	g/s
0.375	0.0107998	0.086	0.010800

A6-40
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **ACD-4**
Source Description: **Bottom Ash Silo 2 Dust Collector**
Pollutants: **PM10**

Emission Factor From: **Manufacturer Guarantee**

Explanation: Emissions factor for PM10 for the Bottom Ash Silo 2 dust collector is stated by the manufacturers guarantee to be 0.01 grains per dry standard cubic foot.

Emissions are calculated by multiplying the emission factor for PM10 by the maximum flow rating of the baghouse in standard cubic feet per minute. This yields an emissions rate in grains per minute. To generate a short term emission rate in pounds per hour, the calculated emission rate is multiplied by 60 minutes per hour, which is subsequently divided by 7000 grains per pound. To generate an annual emission rate, the short term emission rate is multiplied by the number of hours of operation per year in which material handling will be performed. This yields an emission rate in pounds per year, which is subsequently divided by 2000 to yield tons per year.

PM_{10} Emission Factor = **0.01** **gr/dscf**
1,000 **scfm**

Short Term Emissions: **PM_{10} in lbs/hr = (baghouse flow rate scfm)*(0.01 gr/dscf)/(7000 gr/lb)*(60 min/hr)**

Annual Emissions: **PM_{10} in tons per year = (Short Term PM_{10})(8760 hr/yr)/(2000 lb/ton)**

Annual PM_{10} EMISSIONS		Short Term	
(TPY)	(g/s)	lb/hr	g/s
0.375	0.0107998	0.086	0.010800

A6-41
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **GH-1**
Source Description: **Gypsum Stockout Conveyor**
Pollutants: **PM_{10}**

Emission Factor From: **AP-42, Section 13.2.4**
"Aggregate Handling and Storage Piles"

Emission Factor Rating: **A**

Explanation: The emissions factor for PM10 for the gypsum stockout conveyor is calculated by using the predictive emission equation specified in Section 13.2.4, Equation (1) in units of pounds per ton. This equation states that emissions factor of PM10 can be calculated by multiplying the Aerodynamic Particle Size Multiplier provided in the text by 0.0032. This result is multiplied by the quantity of the mean wind speed divided by 5 and raised to the power of 1.3, with this quantity divided by the quantity of the material moisture content divided by 2 and raised to the power of 1.4. The product of the multiplication specified by Equation (1) is the emission factor in pounds per ton of material processed in a batch drop operation.

The mean wind speed used was the site specific mean wind speed.

Emissions are calculated by multiplying the emission factor for PM10 by the amount of gypsum loaded per hour. This yields a short term emission rate in pounds per hour. To generate an annual emission rate, the calculated emission rate is multiplied by the number of hours of operation per year in which material handling will be performed. This yields an emission rate in pounds per year, which is subsequently divided by 2000 to yield tons per year.

Emission Equations:

$$E = k*0.0032*[((U/5)^{1.3})/((M/2)^{1.4})] \quad \text{lbs/ton} \quad \text{Equation (1)}$$

$$PM_{10}\ \text{emissions} = E*(\text{coal loaded})*(1-C) \quad \text{lb/hr} \quad \text{Equation (2)}$$

Where:
E is the emission factor
k is the Aerodynamic Particle Size Multiplier (dimensionless)
U is the mean wind speed in mile per hour
M is the material moisture content in percent

Data:

U =	**9.80**	**mph - mean wind speed**
M =	**10.00**	**% - material moisture content**
k =	**0.35**	**Aerodynamic Particle Size Multiplier**

PM_{10} Emission Factor = **0.0002822** **lbs/ton**
400 **tons/hr**

Short Term Emissions: **PM_{10} in lbs/hr =**
(0.35)(0.0032)[((9.8/5)1.3)/((10/2)1.4)](tons gypsum loaded per hour)

Annual Emissions: **PM_{10} in tons per year =**
(0.35)(0.0032)[((9.8/5)1.3)/((10/2)1.4)][(tons gypsum loaded per hour)(8760 hr/yr)/(2000 lb/ton)]

Annual PM_{10} EMISSIONS		Short Term	
(TPY)	(g/s)	lb/hr	g/s
0.494	0.0142238	0.113	0.014224

A6-42
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **GH-2**
Source Description: **Gypsum Pile Wind Erosion and Maintenance**
Pollutants: **PM_{10}**

Emission Factor From: **AP-42, TABLE 11.9-1**
"Emission Factor Equations for Uncontrolled Open Dust Sources at Western Surface Coal Mines"
AP-42, Section 13.2.4
"Aggregate Handling and Storage Piles"

Emission Factor Rating: **C** **(Rating applicable to N.W. CO, S.W. CO, and N.E. WY surface sub-bituminous coal mines)**

Explanation: Emissions for PM_{10} from active storage pile wind erosion and maintenance is calculated from the emission factor for Total Suspended Particulate (TSP) provided in Table 11.9-1 and multiplying that value by the average wind speed and the Aerodynamic Particle Size Multiplier for PM_{10} from Section 13.2.4.

The mean wind speed used was the average wind speed for the 1986 - 1990 period for the Ely, NV meteorological station. This multiplication yields an emission rate in pounds per acre-hour.

Emissions are calculated by multiplying the emission factor for PM10 by the total acreage of the area of disturbance, multiplied by 1 minus the control efficiency in percentage. This yields a short term emission rate in pounds per hour. To generate an annual emission rate, the calculated emission rate is multiplied by the number of hours of operation per year in which material handling will be performed. This yields an emission rate in pounds per year, which is subsequently divided by 2000 to yield tons per year.

Emission Equations:
TSP: $E = 0.72*u$ **lbs/acre-hr**
PM_{10}: $E = 0.72*u*k$ **lbs/acre-hr**

Where: E is the emission factor
u is the average wind speed (mph)

Data:
u = 9.8 mph - 1989 - 1990 Ely, NV mean wind speed
k = 0.35 Aerodynamic Particle Size Multiplier for PM_{10}
C = 75% control efficiency assumed associated with 3-sided enclosure
A = 0.33 total acreage of area of disturbance

Short Term Emissions: **PM_{10} in lbs/hr = (0.72)*(9.8 mph)*(0.35)*(total acreage disturbed)*(1-0.75)**

Annual Emissions: **PM_{10} in tons per year = (Short Term PM_{10})(8760 hr/yr)/(2000 lb/ton)**

Annual PM_{10} EMISSIONS		Short Term	
TPY	g/s	lb/hr	g/s
0.91	2.61E-02	0.21	2.61E-02

A6-43
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **IDC-1**
Source Description: **DSI Storage Silo Unit 1 Dust Collector**
Pollutants: **PM10**

Emission Factor From: **Manufacturer Guarantee**

Explanation: Emissions factor for PM10 for the DSI Storage Silo Unit 1 dust collector is stated by the manufacturers guarantee to be 0.01 grains per dry standard cubic foot.

Emissions are calculated by multiplying the emission factor for PM10 by the maximum flow rating of the baghouse in standard cubic feet per minute. This yields an emissions rate in grains per minute. To generate a short term emission rate in pounds per hour, the calculated emission rate is multiplied by 60 minutes per hour, which is subsequently divided by 7000 grains per pound. To generate an annual emission rate, the short term emission rate is multiplied by the number of hours of operation per year in which material handling will be performed. This yields an emission rate in pounds per year, which is subsequently divided by 2000 to yield tons per year.

PM_{10} Emission Factor = **0.01** **gr/dscf**
600 **scfm**

Short Term Emissions: **PM_{10} in lbs/hr = (baghouse flow rate scfm)*(0.01 gr/dscf)/(7000 gr/lb)*(60 min/hr)**

Annual Emissions: **PM_{10} in tons per year = (Short Term PM_{10})(8760 hr/yr)/(2000 lb/ton)**

Annual PM_{10} EMISSIONS		Short Term	
(TPY)	(g/s)	lb/hr	g/s
0.225	0.0064799	0.051	0.006480

A6-44
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **IDC-2**
Source Description: **PAC Storage Silo Unit 1 Dust Collector**
Pollutants: **PM10**

Emission Factor From: **Manufacturer Guarantee**

Explanation: Emissions factor for PM10 for the PAC Storage Silo Unit 1 dust collector is stated by the manufacturers guarantee to be 0.01 grains per dry standard cubic foot.

Emissions are calculated by multiplying the emission factor for PM10 by the maximum flow rating of the baghouse in standard cubic feet per minute. This yields an emissions rate in grains per minute. To generate a short term emission rate in pounds per hour, the calculated emission rate is multiplied by 60 minutes per hour, which is subsequently divided by 7000 grains per pound. To generate an annual emission rate, the short term emission rate is multiplied by the number of hours of operation per year in which material handling will be performed. This yields an emission rate in pounds per year, which is subsequently divided by 2000 to yield tons per year.

PM_{10} Emission Factor = **0.01** **gr/dscf**
600 **scfm**

Short Term Emissions: **PM_{10} in lbs/hr = (baghouse flow rate scfm)*(0.01 gr/dscf)/(7000 gr/lb)*(60 min/hr)**

Annual Emissions: **PM_{10} in tons per year = (Short Term PM_{10})(8760 hr/yr)/(2000 lb/ton)**

Annual PM_{10} EMISSIONS		Short Term	
(TPY)	(g/s)	lb/hr	g/s
0.225	0.0064799	0.051	0.006480

A6-45
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **IDC-3**
Source Description: **DSI Storage Silo Unit 2 Dust Collector**
Pollutants: **PM10**

Emission Factor From: **Manufacturer Guarantee**

Explanation: Emissions factor for PM10 for the DSI Storage Silo Unit 2 dust collector is stated by the manufacturers guarantee to be 0.01 grains per dry standard cubic foot.

Emissions are calculated by multiplying the emission factor for PM10 by the maximum flow rating of the baghouse in standard cubic feet per minute. This yields an emissions rate in grains per minute. To generate a short term emission rate in pounds per hour, the calculated emission rate is multiplied by 60 minutes per hour, which is subsequently divided by 7000 grains per pound. To generate an annual emission rate, the short term emission rate is multiplied by the number of hours of operation per year in which material handling will be performed. This yields an emission rate in pounds per year, which is subsequently divided by 2000 to yield tons per year.

PM_{10} Emission Factor = **0.01** **gr/dscf**
600 **scfm**

Short Term Emissions: **PM_{10} in lbs/hr = (baghouse flow rate scfm)*(0.01 gr/dscf)/(7000 gr/lb)*(60 min/hr)**

Annual Emissions: **PM_{10} in tons per year = (Short Term PM_{10})(8760 hr/yr)/(2000 lb/ton)**

Annual PM_{10} EMISSIONS		Short Term	
(TPY)	(g/s)	lb/hr	g/s
0.225	0.0064799	0.051	0.006480

A6-46
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **IDC-4**
Source Description: **PAC Storage Silo Unit 2 Dust Collector**
Pollutants: **PM10**

Emission Factor From: **Manufacturer Guarantee**

Explanation: Emissions factor for PM10 for the PAC Storage Silo Unit 2 dust collector is stated by the manufacturers guarantee to be 0.01 grains per dry standard cubic foot.

Emissions are calculated by multiplying the emission factor for PM10 by the maximum flow rating of the baghouse in standard cubic feet per minute. This yields an emissions rate in grains per minute. To generate a short term emission rate in pounds per hour, the calculated emission rate is multiplied by 60 minutes per hour, which is subsequently divided by 7000 grains per pound. To generate an annual emission rate, the short term emission rate is multiplied by the number of hours of operation per year in which material handling will be performed. This yields an emission rate in pounds per year, which is subsequently divided by 2000 to yield tons per year.

PM_{10} Emission Factor = **0.01** **gr/dscf**
600 **scfm**

Short Term Emissions: **PM_{10} in lbs/hr = (baghouse flow rate scfm)*(0.01 gr/dscf)/(7000 gr/lb)*(60 min/hr)**

Annual Emissions: **PM_{10} in tons per year = (Short Term PM_{10})(8760 hr/yr)/(2000 lb/ton)**

Annual PM_{10} EMISSIONS		Short Term	
(TPY)	(g/s)	lb/hr	g/s
0.225	0.0064799	0.051	0.006480

A6-47
SIERRA PACIFIC POWER COMPANY
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EMISSIONS CALCULATIONS

Source Name: **WDC-1**
Source Description: **Soda Ash Storage Silo Dust Collector**
Pollutants: **PM10**

Emission Factor From: **Manufacturer Guarantee**

Explanation: Emissions factor for PM10 for the Soda Ash Storage Silo dust collector is stated by the manufacturers guarantee to be 0.01 grains per dry standard cubic foot.

Emissions are calculated by multiplying the emission factor for PM10 by the maximum flow rating of the baghouse in standard cubic feet per minute. This yields an emissions rate in grains per minute. To generate a short term emission rate in pounds per hour, the calculated emission rate is multiplied by 60 minutes per hour, which is subsequently divided by 7000 grains per pound. To generate an annual emission rate, the short term emission rate is multiplied by the number of hours of operation per year in which material handling will be performed. This yields an emission rate in pounds per year, which is subsequently divided by 2000 to yield tons per year.

PM_{10} Emission Factor = **0.01** **gr/dscf**
600 **scfm**

Short Term Emissions: **PM_{10} in lbs/hr = (baghouse flow rate scfm)*(0.01 gr/dscf)/(7000 gr/lb)*(60 min/hr)**

Annual Emissions: **PM_{10} in tons per year = (Short Term PM_{10})(8760 hr/yr)/(2000 lb/ton)**

Annual PM_{10} EMISSIONS		Short Term	
(TPY)	(g/s)	lb/hr	g/s
0.225	0.0064799	0.051	0.006480

A6-48
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **WDC-2**
Source Description: **Lime Storage Silo Dust Collector**
Pollutants: **PM10**

Emission Factor From: **Manufacturer Guarantee**

Explanation: Emissions factor for PM10 for the Lime Storage Silo dust collector is stated by the manufacturers guarantee to be 0.01 grains per dry standard cubic foot.

Emissions are calculated by multiplying the emission factor for PM10 by the maximum flow rating of the baghouse in standard cubic feet per minute. This yields an emissions rate in grains per minute. To generate a short term emission rate in pounds per hour, the calculated emission rate is multiplied by 60 minutes per hour, which is subsequently divided by 7000 grains per pound. To generate an annual emission rate, the short term emission rate is multiplied by the number of hours of operation per year in which material handling will be performed. This yields an emission rate in pounds per year, which is subsequently divided by 2000 to yield tons per year.

PM_{10} Emission Factor = **0.01** **gr/dscf**
600 **scfm**

Short Term Emissions: **PM_{10} in lbs/hr = (baghouse flow rate scfm)*(0.01 gr/dscf)/(7000 gr/lb)*(60 min/hr)**

Annual Emissions: **PM_{10} in tons per year = (Short Term PM_{10})(8760 hr/yr)/(2000 lb/ton)**

Annual PM_{10} EMISSIONS		Short Term	
(TPY)	(g/s)	lb/hr	g/s
0.225	0.0064799	0.051	0.006480

A6-49
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **WDC-3**
Source Description: **Magnesium Hydroxide Storage Silo Dust Collector**
Pollutants: **PM10**

Emission Factor From: **Manufacturer Guarantee**

Explanation: Emissions factor for PM10 for the Magnesium Hydroxide Storage Silo dust collector is stated by the manufacturers guarantee to be 0.01 grains per dry standard cubic foot.

Emissions are calculated by multiplying the emission factor for PM10 by the maximum flow rating of the baghouse in standard cubic feet per minute. This yields an emissions rate in grains per minute. To generate a short term emission rate in pounds per hour, the calculated emission rate is multiplied by 60 minutes per hour, which is subsequently divided by 7000 grains per pound. To generate an annual emission rate, the short term emission rate is multiplied by the number of hours of operation per year in which material handling will be performed. This yields an emission rate in pounds per year, which is subsequently divided by 2000 to yield tons per year.

PM_{10} Emission Factor = **0.01** **gr/dscf**
600 **scfm**

Short Term Emissions: **PM_{10} in lbs/hr = (baghouse flow rate scfm)*(0.01 gr/dscf)/(7000 gr/lb)*(60 min/hr)**

Annual Emissions: **PM_{10} in tons per year = (Short Term PM_{10})(8760 hr/yr)/(2000 lb/ton)**

Annual PM_{10} EMISSIONS		Short Term	
(TPY)	(g/s)	lb/hr	g/s
0.225	0.0064799	0.051	0.006480

A6-50
SIERRA PACIFIC POWER COMPANY
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EMISSIONS CALCULATIONS

Source Name: **LF-1, LF-2, LF-3**
Emission Source: **INACTIVE LANDFILL PILE WIND EROSION**
Pollutants: **PM_{10}**

Emission Factor From: **AP-42, Section 13.2.5**
"Industrial Wind Erosion"

Emission Factor Rating: **NA**

Explanation:

Emissions for PM10 from wind erosion of undisturbed area sources is calculated based on the Predictive Emission Factor Equation (Equation 2 in AP-42, Section 13.2.5). This equation relies on the calculation of the erosion potential function for a dry, exposed surface, which in turn relies on the estimation of friction velocity and threshold friction velocity of the disturbed surface. Because there are no disturbances expected for this exposed surface, no emissions are associated with this source.

Friction velocity is calculated based on the fastest mile of the reference anemometer for the period between disturbances. The series of required calculations are shown below.

This multiplication yields an emission rate in grams per square meter.

Emission Equations: **PM_{10}:** **$E = k*N*P$** **(g/m^2)**

Where:
E is the emission factor
k is the Aerodynamic Particle Size Multiplier (dimensionless)
N is the number of disturbances per year
P is the erosion potential corresponding to the observed fastest mile of wind for the period between disturbances (calculated)

Data:
k = 0.5 **Aerodynamic Particle Size Multiplier for PM < 10 mm**
N = 0 **No disturbances per year are expected on the inactive portion of the landfill**

$P = 58 (u^* - u_t^*)^2 + 25(u^* - u_t^*)$

Where:
P is the erosion potential corresponding to the observed fastest mile of wind for the period between disturbances
u* is the friction velocity (calculated)
u_t^* is the threshold velocity found in AP-42, Table 13.2.5-2

Data:
$u_t^* =$ 1.02 **Threshold Friction Velocity (m/s) in AP-42 Table 13.2.5-2 for "Overburden"**

$u^* = 0.053*u_{10}$ **Note:** This equation is restricted to large relatively flat piles or exposed areas with little penetration into the surface wind layer.

Where:
u* is the friction velocity
u_{10} is the fastest mile of reference anemometer for period between disturbances (calculated) (m/s)

$u_{10} = u * (\ln(10/0.005)/\ln(H_{an}/0.005))$

Data:
u = 18.6 **Fastest mile at the Ely, NV meteorological station for the period 1986 - 1990 (m/s)**
$H_{an} =$ 6.1 **Anemometer height (m)**

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EMISSIONS CALCULATIONS

Calculated Values
u_{10} = 19.9 (m/s)
u* = 1.06 (m/s)
P = 0.98 (g/m^2)
E = 0.000 ($g/m^2/yr$)

Data:
Area 1 = 2,141,345 undisturbed, exposed area (m^2)
Area 2 = 850,615.6 undisturbed, exposed area (m^2)
5 yr cell = 363,283.6 undisturbed, exposed area (m^2)
C = 0.0% percent control efficiency

Short Term Emissions: PM_{10} in lbs/hr = (0.49)*(total undisturbed area)

Annual Emissions: PM_{10} in tons per year = (Short Term PM_{10})(8760 hr/yr)/(2000 lb/ton)

Landfill Area	Source Name	Annual PM_{10} EMISSIONS		Short Term	
		TPY	g/s	lb/hr	g/s
East Portion	LF-1	0.000	0.00E+00	0.000	0.00E+00
West Portion	LF-2	0.000	0.00E+00	0.000	0.00E+00
5-year Cell	LF-3	0.000	0.00E+00	0.000	0.00E+00

A6-51
SIERRA PACIFIC POWER COMPANY
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EMISSIONS CALCULATIONS

Source Name: **LF-4**
Source Description: **Landfill Stockout**
Pollutants: **PM_{10}**

Emission Factor From: **AP-42, Section 13.2.4**
"Aggregate Handling and Storage Piles"

Emission Factor Rating: **A**

Explanation: The emissions factor for PM10 for landfill stockout is calculated by using the predictive emission equation specified in Section 13.2.4, Equation (1) in units of pounds per ton. This equation states that emissions factor of PM10 can be calculated by multiplying the Aerodynamic Particle Size Multiplier provided in the text by 0.0032. This result is multiplied by the quantity of the mean wind speed divided by 5 and raised to the power of 1.3, with this quantity divided by the quantity of the material moisture content divided by 2 and raised to the power of 1.4. The product of the multiplication specified by Equation (1) is the emission factor in pounds per ton of material processed in a batch drop operation.

The mean wind speed used was the site specific mean wind speed.

Emissions are calculated by multiplying the emission factor for PM10 by the amount of landfill material loaded per hour. This yields a short term emission rate in pounds per hour. To generate an annual emission rate, the calculated emission rate is multiplied by the number of hours of operation per year in which material handling will be performed. This yields an emission rate in pounds per year, which is subsequently divided by 2000 to yield tons per year.

Emission Equations:

$$E = k*0.0032*[((U/5)^{1.3})/((M/2)^{1.4})] \quad \text{lbs/ton} \quad \text{Equation (1)}$$

$$PM_{10}\ \text{emissions} = E*(\text{coal loaded})*(1-C) \quad \text{lb/hr} \quad \text{Equation (2)}$$

Where:
E is the emission factor
k is the Aerodynamic Particle Size Multiplier (dimensionless)
U is the mean wind speed in mile per hour
M is the material moisture content in percent

Data:

U =	**9.80**	**mph - mean wind speed**
M =	**10.00**	**% - material moisture content**
k =	**0.35**	**Aerodynamic Particle Size Multiplier**
C =	**90%**	**control efficiency assumed associated with water trucks and crusting expected**

PM_{10} Emission Factor = **0.0000282** **lbs/ton**
122 **tons/hr**

Short Term Emissions: **PM_{10} in lbs/hr =**
(0.35)*(0.0032)*[((9.8/5)1.3)/((10/2)1.4)]*(tons landfill material loaded per hour)*(1-0.90)

Annual Emissions: **PM_{10} in tons per year =**
(0.35)*(0.0032)*[((9.8/5)1.3)/((10/2)1.4)]*(tons landfill material loaded per hour)*(1-0.90)*(8760 hr/yr)/(2000 lb/ton)

Annual PM_{10} EMISSIONS		Short Term	
(TPY)	(g/s)	lb/hr	g/s
0.015	0.0004338	0.003	0.000434

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EMISSIONS CALCULATIONS

Source Name: **LF-5**
Source Description: **Active Landfill Pile Wind Erosion and Maintenance**
Pollutants: **PM_{10}**

Emission Factor From: **AP-42, TABLE 11.9-1**
"Emission Factor Equations for Uncontrolled Open Dust Sources at Western Surface Coal Mines"
AP-42, Section 13.2.4
"Aggregate Handling and Storage Piles"

Emission Factor Rating: **C** **(Rating applicable to N.W. CO, S.W. CO, and N.E. WY surface sub-bituminous coal mines)**

Explanation: Emissions for PM_{10} from active storage pile wind erosion and maintenance is calculated from the emission factor for Total Suspended Particulate (TSP) provided in Table 11.9-1 and multiplying that value by the average wind speed and the Aerodynamic Particle Size Multiplier for PM_{10} from Section 13.2.4.

The mean wind speed used was the average wind speed for the 1986 - 1990 period for the Ely, NV meteorological station. This multiplication yields an emission rate in pounds per acre-hour.

Emissions are calculated by multiplying the emission factor for PM10 by the total acreage of the area of disturbance, multiplied by 1 minus the control efficiency in percentage. This yields a short term emission rate in pounds per hour. To generate an annual emission rate, the calculated emission rate is multiplied by the number of hours of operation per year in which material handling will be performed. This yields an emission rate in pounds per year, which is subsequently divided by 2000 to yield tons per year.

Emission Equations:

TSP:	**$E = 0.72*u$**	**lbs/acre-hr**
PM_{10}:	**$E = 0.72*u*k$**	**lbs/acre-hr**

Where: E is the emission factor
u is the average wind speed (mph)

Data:

u =	**9.8**	**mph - 1989 - 1990 Ely, NV mean wind speed**
k =	**0.35**	**Aerodynamic Particle Size Multiplier for PM_{10}**
C =	**90%**	**control efficiency assumed associated with water trucks and crusting expected**
A =	**9.86**	**total acreage of area of disturbance**

Short Term Emissions: **PM_{10} in lbs/hr = (0.72)*(9.8 mph)*(0.35)*(total acreage disturbed)*(1-0.90)**

Annual Emissions: **PM_{10} in tons per year = (Short Term PM_{10})(8760 hr/yr)/(2000 lb/ton)**

Annual PM_{10} EMISSIONS		Short Term	
TPY	**g/s**	**lb/hr**	**g/s**
10.66	3.07E-01	2.43	3.07E-01

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ROAD HAUL EMISSIONS CRITERIA POLLUTANTS

(a)	Paved Road AP-42 Emission Factor (lb/VMT)	E	=	(k (sL/2)^0.65 (W/3)^1.5 - C) * (1-(P/4/N))
(b)	Unpaved Road AP-42 Emission Factor (lb/VMT)	E	=	(k (s/12)^a (W/3)^b) * ((365-p)/365)

Limestone Supply

	Average Round Trip Distance		=	0.0	miles Paved	
			=	3.9	miles Unpaved	
	Tons per year (m)		=	11,287.00	tons/yr	
	tons per truck (n)		=	20	tons/truck	
	Trucks per year		=	564	trucks/yr	loaded
Paved	Constant PM-10 (lb/VMT)	k	=	0.016	(i)	
Paved	Constant PM (lb/VMT)	k	=	0.082	(i)	
Paved	Paved Silt Loading (g/m^2)	sL	=	9.7	(j)	
Paved	1980's Vehicle Fleet Emission Factor PM-10 (lb/VMT)	C	=	0.00047	(k)	
Paved	1980's Vehicle Fleet Emission Factor PM (lb/VMT)	C	=	0.00047	(k)	
Unpaved	Constant PM-10 (lb/VMT)	k	=	1.5	(c)	
Unpaved	Constant PM (lb/VMT)	k	=	4.9	(c)	
Unpaved	Surface Material Silt Content (%)	s	=	8.4	(d)	
Unpaved	Constant PM-10 (lb/VMT)	a	=	0.9	(c)	
Unpaved	Constant PM (lb/VMT)	a	=	0.7	(c)	
Unpaved	Constant PM-10 (lb/VMT)	b	=	0.45	(c)	
Unpaved	Constant PM (lb/VMT)	b	=	0.45	(c)	
	Average Fleet Truck weight (ton)	W	=	33	(e)	
	Annual days with rain	p	=	73.7	(f)	
	Number of days in precipitation averaging period	N	=	365		
Paved	Road Uncontrolled Emission Factor PM10 (lb/VMT)	E	=	1.5		
Paved	Road Uncontrolled Emission Factor PM (lb/VMT)	E	=	7.7		
Unpaved	Road Uncontrolled Emission Factor PM10 (lb/VMT)	E	=	2.5		
Unpaved	Road Uncontrolled Emission Factor PM (lb/VMT)	E	=	8.9		
Paved	Annual Vehicle Miles (VMT)	VMT	=	0	(g)	
Unpaved	Annual Vehicle Miles (VMT)	VMT	=	2,202	(g)	6.03367348 VMT/day
Unpaved	Mg/Cl Control Efficiency and reduce speed		=	95%	(h)	
Paved	Control Efficiency (vacuum sweeping twice per month)		=	79%	(l)	

Controlled PM-10 Paved Road Emissions	=	0.00	TPY
Controlled PM-10 Unpaved Road Emissions	=	0.49	TPY

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ROAD HAUL EMISSIONS CRITERIA POLLUTANTS

(a)	Paved Road AP-42 Emission Factor (lb/VMT)	E	=	(k (sL/2)^0.65 (W/3)^1.5 - C) * (1-(P/4/N))
(b)	Unpaved Road AP-42 Emission Factor (lb/VMT)	E	=	(k (s/12)^a (W/3)^b) * ((365-p)/365)

Soda Ash Supply

	Average Round Trip Distance		=	0.0	miles Paved
			=	3.9	miles Unpaved
	Tons per year (m)		=	2,190.00	tons/yr
	tons per truck (n)		=	20	tons/truck
	Trucks per year		=	110	trucks/yr loaded

Paved	Constant PM-10 (lb/VMT)	k	=	0.016	(i)
Paved	Constant PM (lb/VMT)	k	=	0.082	(i)
Paved	Paved Silt Loading (g/m^2)	sL	=	9.7	(j)
Paved	1980's Vehicle Fleet Emission Factor PM-10 (lb/VMT)	C	=	0.00047	(k)
Paved	1980's Vehicle Fleet Emission Factor PM (lb/VMT)	C	=	0.00047	(k)
Unpaved	Constant PM-10 (lb/VMT)	k	=	1.5	(c)
Unpaved	Constant PM (lb/VMT)	k	=	4.9	(c)
Unpaved	Surface Material Silt Content (%)	s	=	8.4	(d)
Unpaved	Constant PM-10 (lb/VMT)	a	=	0.9	(c)
Unpaved	Constant PM (lb/VMT)	a	=	0.7	(c)
Unpaved	Constant PM-10 (lb/VMT)	b	=	0.45	(c)
Unpaved	Constant PM (lb/VMT)	b	=	0.45	(c)
	Average Fleet Truck weight (ton)	W	=	33	(e)
	Annual days with rain	p	=	73.7	(f)
	Number of days in precipitation averaging period	N	=	365	
Paved	Road Uncontrolled Emission Factor PM10 (lb/VMT)	E	=	1.5	
Paved	Road Uncontrolled Emission Factor PM (lb/VMT)	E	=	7.7	
Unpaved	Road Uncontrolled Emission Factor PM10 (lb/VMT)	E	=	2.5	
Unpaved	Road Uncontrolled Emission Factor PM (lb/VMT)	E	=	8.9	

Paved	Annual Vehicle Miles (VMT)	VMT	=	0	(g)
Unpaved	Annual Vehicle Miles (VMT)	VMT	=	427	(g)
Unpaved	Mg/Cl Control Efficiency and reduce speed		=	95%	(h)
Paved	Control Efficiency (vacuum sweeping twice per month)		=	79%	(l)

Controlled PM-10 Paved Road Emissions	=	0.00	TPY
Controlled PM-10 Unpaved Road Emissions	=	0.10	TPY

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ROAD HAUL EMISSIONS CRITERIA POLLUTANTS

(a)	Paved Road AP-42 Emission Factor (lb/VMT)	E	=	(k (sL/2)^0.65 (W/3)^1.5 - C) * (1-(P/4/N))
(b)	Unpaved Road AP-42 Emission Factor (lb/VMT)	E	=	(k (s/12)^a (W/3)^b) * ((365-p)/365)

Lime Supply

	Average Round Trip Distance		=	0.0	miles Paved
			=	3.9	miles Unpaved
	Tons per year (m)		=	6,570.00	tons/yr
	tons per truck (n)		=	20	tons/truck
	Trucks per year		=	329	trucks/yr loaded

Paved	Constant PM-10 (lb/VMT)	k	=	0.016	(i)
Paved	Constant PM (lb/VMT)	k	=	0.082	(i)
Paved	Paved Silt Loading (g/m^2)	sL	=	9.7	(j)
Paved	1980's Vehicle Fleet Emission Factor PM-10 (lb/VMT)	C	=	0.00047	(k)
Paved	1980's Vehicle Fleet Emission Factor PM (lb/VMT)	C	=	0.00047	(k)
Unpaved	Constant PM-10 (lb/VMT)	k	=	1.5	(c)
Unpaved	Constant PM (lb/VMT)	k	=	4.9	(c)
Unpaved	Surface Material Silt Content (%)	s	=	8.4	(d)
Unpaved	Constant PM-10 (lb/VMT)	a	=	0.9	(c)
Unpaved	Constant PM (lb/VMT)	a	=	0.7	(c)
Unpaved	Constant PM-10 (lb/VMT)	b	=	0.45	(c)
Unpaved	Constant PM (lb/VMT)	b	=	0.45	(c)
	Average Fleet Truck weight (ton)	W	=	33	(e)
	Annual days with rain	p	=	73.7	(f)
	Number of days in precipitation averaging period	N	=	365	
Paved	Road Uncontrolled Emission Factor PM10 (lb/VMT)	E	=	1.5	
Paved	Road Uncontrolled Emission Factor PM (lb/VMT)	E	=	7.7	
Unpaved	Road Uncontrolled Emission Factor PM10 (lb/VMT)	E	=	2.5	
Unpaved	Road Uncontrolled Emission Factor PM (lb/VMT)	E	=	8.9	

Paved	Annual Vehicle Miles (VMT)	VMT	=	0	(g)
Unpaved	Annual Vehicle Miles (VMT)	VMT	=	1,282	(g)
Unpaved	Mg/Cl Control Efficiency and reduce speed		=	95%	(h)
Paved	Control Efficiency (vacuum sweeping twice per month)		=	79%	(l)

Controlled PM-10 Paved Road Emissions	=	0.00	TPY
Controlled PM-10 Unpaved Road Emissions	=	0.29	TPY

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(a)	Paved Road AP-42 Emission Factor (lb/VMT)	E	=	(k (sL/2)^0.65 (W/3)^1.5 - C) * (1-(P/4/N))
(b)	Unpaved Road AP-42 Emission Factor (lb/VMT)	E	=	(k (s/12)^a (W/3)^b) * ((365-p)/365)

Sorbent Supply

	Average Round Trip Distance		=	0.0	miles Paved
			=	3.9	miles Unpaved
	Tons per year (m)		=	6,745.00	tons/yr
	tons per truck (n)		=	20	tons/truck
	Trucks per year		=	337	trucks/yr loaded

Paved	Constant PM-10 (lb/VMT)	k	=	0.016	(i)
Paved	Constant PM (lb/VMT)	k	=	0.082	(i)
Paved	Paved Silt Loading (g/m^2)	sL	=	9.7	(j)
Paved	1980's Vehicle Fleet Emission Factor PM-10 (lb/VMT)	C	=	0.00047	(k)
Paved	1980's Vehicle Fleet Emission Factor PM (lb/VMT)	C	=	0.00047	(k)
Unpaved	Constant PM-10 (lb/VMT)	k	=	1.5	(c)
Unpaved	Constant PM (lb/VMT)	k	=	4.9	(c)
Unpaved	Surface Material Silt Content (%)	s	=	8.4	(d)
Unpaved	Constant PM-10 (lb/VMT)	a	=	0.9	(c)
Unpaved	Constant PM (lb/VMT)	a	=	0.7	(c)
Unpaved	Constant PM-10 (lb/VMT)	b	=	0.45	(c)
Unpaved	Constant PM (lb/VMT)	b	=	0.45	(c)
	Average Fleet Truck weight (ton)	W	=	33	(e)
	Annual days with rain	p	=	73.7	(f)
	Number of days in precipitation averaging period	N	=	365	
Paved	Road Uncontrolled Emission Factor PM10 (lb/VMT)	E	=	1.5	
Paved	Road Uncontrolled Emission Factor PM (lb/VMT)	E	=	7.7	
Unpaved	Road Uncontrolled Emission Factor PM10 (lb/VMT)	E	=	2.5	
Unpaved	Road Uncontrolled Emission Factor PM (lb/VMT)	E	=	8.9	

Paved	Annual Vehicle Miles (VMT)	VMT	=	0	(g)
Unpaved	Annual Vehicle Miles (VMT)	VMT	=	1,316	(g)
Unpaved	Mg/Cl Control Efficiency and reduce speed		=	95%	(h)
Paved	Control Efficiency (vacuum sweeping twice per month)		=	79%	(l)

Controlled PM-10 Paved Road Emissions	=	0.00	TPY
Controlled PM-10 Unpaved Road Emissions	=	0.29	TPY

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(a)	Paved Road AP-42 Emission Factor (lb/VMT)	E	=	(k (sL/2)^0.65 (W/3)^1.5 - C) * (1-(P/4/N))
(b)	Unpaved Road AP-42 Emission Factor (lb/VMT)	E	=	(k (s/12)^a (W/3)^b) * ((365-p)/365)

Magnesium Hydroxide Supply

Average Round Trip Distance		=	0.0	miles Paved	
		=	3.9	miles Unpaved	
Tons per year (m)		=	1,752.00	tons/yr	assumed equivalent to NH3
tons per truck (n)		=	20	tons/truck	
Trucks per year		=	88	trucks/yr	loaded

Paved	Constant PM-10 (lb/VMT)	k	=	0.016	(i)
Paved	Constant PM (lb/VMT)	k	=	0.082	(i)
Paved	Paved Silt Loading (g/m^2)	sL	=	9.7	(j)
Paved	1980's Vehicle Fleet Emission Factor PM-10 (lb/VMT)	C	=	0.00047	(k)
Paved	1980's Vehicle Fleet Emission Factor PM (lb/VMT)	C	=	0.00047	(k)
Unpaved	Constant PM-10 (lb/VMT)	k	=	1.5	(c)
Unpaved	Constant PM (lb/VMT)	k	=	4.9	(c)
Unpaved	Surface Material Silt Content (%)	s	=	8.4	(d)
Unpaved	Constant PM-10 (lb/VMT)	a	=	0.9	(c)
Unpaved	Constant PM (lb/VMT)	a	=	0.7	(c)
Unpaved	Constant PM-10 (lb/VMT)	b	=	0.45	(c)
Unpaved	Constant PM (lb/VMT)	b	=	0.45	(c)
	Average Fleet Truck weight (ton)	W	=	33	(e)
	Annual days with rain	p	=	73.7	(f)
	Number of days in precipitation averaging period	N	=	365	
Paved	Road Uncontrolled Emission Factor PM10 (lb/VMT)	E	=	1.5	
Paved	Road Uncontrolled Emission Factor PM (lb/VMT)	E	=	7.7	
Unpaved	Road Uncontrolled Emission Factor PM10 (lb/VMT)	E	=	2.5	
Unpaved	Road Uncontrolled Emission Factor PM (lb/VMT)	E	=	8.9	

Paved	Annual Vehicle Miles (VMT)	VMT	=	0	(g)
Unpaved	Annual Vehicle Miles (VMT)	VMT	=	342	(g)
Unpaved	Mg/Cl Control Efficiency and reduce speed		=	95%	(h)
Paved	Control Efficiency (vacuum sweeping twice per month)		=	79%	(l)

Controlled PM-10 Paved Road Emissions	=	0.00	TPY
Controlled PM-10 Unpaved Road Emissions	=	0.08	TPY

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(a)	Paved Road AP-42 Emission Factor (lb/VMT)	E	=	(k (sL/2)^0.65 (W/3)^1.5 - C) * (1-(P/4/N))
(b)	Unpaved Road AP-42 Emission Factor (lb/VMT)	E	=	(k (s/12)^a (W/3)^b) * ((365-p)/365)

Scrubber Sludge to Landfill

	Average Round Trip Distance		=	0.0 miles Paved	
			=	2.8 miles Unpaved	
	Tons per year (m)		=	488,887.00 tons/yr	
	tons per truck (n)		=	62 tons/truck	
	Trucks per year		=	7,885 trucks/yr	loaded
Paved	Constant PM-10 (lb/VMT)	k	=	0.016 (i)	
Paved	Constant PM (lb/VMT)	k	=	0.082 (i)	
Paved	Paved Silt Loading (g/m^2)	sL	=	9.7 (j)	
Paved	1980's Vehicle Fleet Emission Factor PM-10 (lb/VMT)	C	=	0.00047 (k)	
Paved	1980's Vehicle Fleet Emission Factor PM (lb/VMT)	C	=	0.00047 (k)	
Unpaved	Constant PM-10 (lb/VMT)	k	=	1.5 (c)	
Unpaved	Constant PM (lb/VMT)	k	=	4.9 (c)	
Unpaved	Surface Material Silt Content (%)	s	=	8.4 (d)	
Unpaved	Constant PM-10 (lb/VMT)	a	=	0.9 (c)	
Unpaved	Constant PM (lb/VMT)	a	=	0.7 (c)	
Unpaved	Constant PM-10 (lb/VMT)	b	=	0.45 (c)	
Unpaved	Constant PM (lb/VMT)	b	=	0.45 (c)	
	Average Fleet Truck weight (ton)	W	=	33 (e)	
	Annual days with rain	p	=	73.7 (f)	
	Number of days in precipitation averaging period	N	=	365	
Paved	Road Uncontrolled Emission Factor PM10 (lb/VMT)	E	=	1.5	
Paved	Road Uncontrolled Emission Factor PM (lb/VMT)	E	=	7.7	
Unpaved	Road Uncontrolled Emission Factor PM10 (lb/VMT)	E	=	2.5	
Unpaved	Road Uncontrolled Emission Factor PM (lb/VMT)	E	=	8.9	
Paved	Annual Vehicle Miles (VMT)	VMT	=	0 (g)	
Unpaved	Annual Vehicle Miles (VMT)	VMT	=	22,223 (g)	
Unpaved	Mg/Cl Control Efficiency and reduce speed		=	95% (h)	
Paved	Control Efficiency (vacuum sweeping twice per month)		=	79% (l)	
	Controlled PM-10 Paved Road Emissions	=		0.00 TPY	
	Controlled PM-10 Unpaved Road Emissions	=		1.41 TPY	

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(a)	Paved Road AP-42 Emission Factor (lb/VMT)	E	=	(k (sL/2)^0.65 (W/3)^1.5 - C) * (1-(P/4/N))
(b)	Unpaved Road AP-42 Emission Factor (lb/VMT)	E	=	(k (s/12)^a (W/3)^b) * ((365-p)/365)

Fly Ash trucked to landfill

	Average Round Trip Distance		=	0.0 miles Paved	
			=	2.7 miles Unpaved	
	Tons per year (m)		=	987,094.00 tons/yr	
	tons per truck (n)		=	62 tons/truck	
	Trucks per year		=	15,921 trucks/yr	loaded

Paved	Constant PM-10 (lb/VMT)	k	=	0.016	(i)
Paved	Constant PM (lb/VMT)	k	=	0.082	(i)
Paved	Paved Silt Loading (g/m^2)	sL	=	9.7	(j)
Paved	1980's Vehicle Fleet Emission Factor PM-10 (lb/VMT)	C	=	0.00047	(k)
Paved	1980's Vehicle Fleet Emission Factor PM (lb/VMT)	C	=	0.00047	(k)
Unpaved	Constant PM-10 (lb/VMT)	k	=	1.5	(c)
Unpaved	Constant PM (lb/VMT)	k	=	4.9	(c)
Unpaved	Surface Material Silt Content (%)	s	=	8.4	(d)
Unpaved	Constant PM-10 (lb/VMT)	a	=	0.9	(c)
Unpaved	Constant PM (lb/VMT)	a	=	0.7	(c)
Unpaved	Constant PM-10 (lb/VMT)	b	=	0.45	(c)
Unpaved	Constant PM (lb/VMT)	b	=	0.45	(c)
	Average Fleet Truck weight (ton)	W	=	33	(e)
	Annual days with rain	p	=	73.7	(f)
	Number of days in precipitation averaging period	N	=	365	
Paved	Road Uncontrolled Emission Factor PM10 (lb/VMT)	E	=	1.5	
Paved	Road Uncontrolled Emission Factor PM (lb/VMT)	E	=	7.7	
Unpaved	Road Uncontrolled Emission Factor PM10 (lb/VMT)	E	=	2.5	
Unpaved	Road Uncontrolled Emission Factor PM (lb/VMT)	E	=	8.9	

Paved	Annual Vehicle Miles (VMT)	VMT	=	0	(g)
Unpaved	Annual Vehicle Miles (VMT)	VMT	=	43,663	(g)
Unpaved	Mg/Cl Control Efficiency and reduce speed		=	95%	(h)
Paved	Control Efficiency (vacuum sweeping twice per month)		=	79%	(l)

Controlled PM-10 Paved Road Emissions	=	0.00	TPY
Controlled PM-10 Unpaved Road Emissions	=	2.77	TPY

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(a)	Paved Road AP-42 Emission Factor (lb/VMT)	E	=	(k (sL/2)^0.65 (W/3)^1.5 - C) * (1-(P/4/N))
(b)	Unpaved Road AP-42 Emission Factor (lb/VMT)	E	=	(k (s/12)^a (W/3)^b) * ((365-p)/365)

Bottom Ash trucked to landfill

	Average Round Trip Distance		=	0.0 miles Paved	
			=	3.1 miles Unpaved	
	Tons per year (m)		=	246,769.00 tons/yr	
	tons per truck (n)		=	62 tons/truck	
	Trucks per year		=	3,980 trucks/yr	loaded
Paved	Constant PM-10 (lb/VMT)	k	=	0.016 (i)	
Paved	Constant PM (lb/VMT)	k	=	0.082 (i)	
Paved	Paved Silt Loading (g/m^2)	sL	=	9.7 (j)	
Paved	1980's Vehicle Fleet Emission Factor PM-10 (lb/VMT)	C	=	0.00047 (k)	
Paved	1980's Vehicle Fleet Emission Factor PM (lb/VMT)	C	=	0.00047 (k)	
Unpaved	Constant PM-10 (lb/VMT)	k	=	1.5 (c)	
Unpaved	Constant PM (lb/VMT)	k	=	4.9 (c)	
Unpaved	Surface Material Silt Content (%)	s	=	8.4 (d)	
Unpaved	Constant PM-10 (lb/VMT)	a	=	0.9 (c)	
Unpaved	Constant PM (lb/VMT)	a	=	0.7 (c)	
Unpaved	Constant PM-10 (lb/VMT)	b	=	0.45 (c)	
Unpaved	Constant PM (lb/VMT)	b	=	0.45 (c)	
	Average Fleet Truck weight (ton)	W	=	33 (e)	
	Annual days with rain	p	=	73.7 (f)	
	Number of days in precipitation averaging period	N	=	365	
Paved	Road Uncontrolled Emission Factor PM10 (lb/VMT)	E	=	1.5	
Paved	Road Uncontrolled Emission Factor PM (lb/VMT)	E	=	7.7	
Unpaved	Road Uncontrolled Emission Factor PM10 (lb/VMT)	E	=	2.5	
Unpaved	Road Uncontrolled Emission Factor PM (lb/VMT)	E	=	8.9	
Paved	Annual Vehicle Miles (VMT)	VMT	=	0 (g)	
Unpaved	Annual Vehicle Miles (VMT)	VMT	=	12,423 (g)	
Unpaved	Mg/Cl Control Efficiency and reduce speed		=	95% (h)	
Paved	Control Efficiency (vacuum sweeping twice per month)		=	79% (l)	
	Controlled PM-10 Paved Road Emissions	=		0.00 TPY	
	Controlled PM-10 Unpaved Road Emissions	=		0.79 TPY	

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(a)	Paved Road AP-42 Emission Factor (lb/VMT)	E	=	(k (sL/2)^0.65 (W/3)^1.5 - C) * (1-(P/4/N))
(b)	Unpaved Road AP-42 Emission Factor (lb/VMT)	E	=	(k (s/12)^a (W/3)^b) * ((365-p)/365)

Notes:
(a) AP-42 Section 13.2.1, Equation 2; December 2003
(b) AP-42 Section 13.2.2, Equation 2; December 2003
(c) AP-42, Section 13.2.2, Table 13.2.2-2 for industrial roads (Dec. 2003)
(d) AP-42, Section 13.2.2, Table 13.2.2-1, Western Surface Coal Mining-haul road to/from pit (Dec. 2003)
(e) Average of loaded and unloaded truck weights estimated by Burns & McDonnell
(f) Average number of days reporting 0.01" or more of precipitation per year in Ely, Nevada. Climate Normals Data based on 1961 - 1990 record period.
(g) VMT are calculated from estimated tons per year trucked
(h) AP-42 Section 13.2.2.3, "Past field testing of emissions from controlled unpaved roads has shown that chemical dust suppressants provide a PM10 control efficiency of about 80 percent when applied at regular intervals of 2 weeks to 1 month."
(i) AP-42, Section 13.2.1, Table 13.2-1.1 (Dec. 2003)
(j) AP-42, Section 13.2.1, Table 13.2.1-4 for Iron & Steel Production (Dec. 2003)
(k) AP-42, Section 13.2.1, Table 13.2.1-2 (Dec. 2003)
(l) Air Pollution Training Institute (APTI) course 4.19b "Preparation of Fine Particulate Emission Inventories" Chapter 7: Fugitive Dust Area Sources
(m) Estimated by C&B
(n) Estimated by C&B

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ROAD HAUL LENGTH CALCULATIONS

Road ID	Length (ft)	Length (m)	Thickness (m)	Adjusted width (m)	Max Number of volume sources - N	volume sources modeled	Volume source spacing (m)	source height[a] (m)	sigma (y0)	sigma (z0)	Release Height (m)
Material Supply by truck											
H8 - H6	7200	2194.56	6.5	12.5	176	88	25	9.144	11.63	4.25	4.57
H6 - H3	1100	335.28	6.5	12.5	27	13	25	9.144	11.63	4.25	4.57
H3 - H4	100	30.48	6.5	12.5	2	2	13	9.144	5.81	4.25	4.57
H4 - G2	200	60.96	6.5	12.5	5	5	13	9.144	5.81	4.25	4.57
G2 - F1	200	60.96	6.5	12.5	5	5	13	9.144	5.81	4.25	4.57
F1 - E3	200	60.96	6.5	12.5	5	5	13	9.144	5.81	4.25	4.57
E3 - E1	300	91.44	6.5	12.5	7	7	13	9.144	5.81	4.25	4.57
E1 - D3	200	60.96	6.5	12.5	5	5	13	9.144	5.81	4.25	4.57
D3 - D4	300	91.44	6.5	12.5	7	7	13	9.144	5.81	4.25	4.57
D4 - D5	300	91.44	6.5	12.5	7	7	13	9.144	5.81	4.25	4.57
D5 - D8	200	60.96	6.5	12.5	5	5	13	9.144	5.81	4.25	4.57
	total miles	**1.95**									
Bottom Ash to Landfill											
F2 - F1	500	152.4	6.5	12.5	12	6	25	9.144	11.63	4.25	4.57
F1 - E3	200	60.96	6.5	12.5	5	5	13	9.144	5.81	4.25	4.57
E3 - E1	400	121.92	6.5	12.5	10	10	13	9.144	5.81	4.25	4.57
E1 - D3	200	60.96	6.5	12.5	5	5	13	9.144	5.81	4.25	4.57
D3 - D1	400	121.92	6.5	12.5	10	10	13	9.144	5.81	4.25	4.57
D1 - C2	100	30.48	6.5	12.5	2	2	13	9.144	5.81	4.25	4.57
C2 - C3	600	182.88	6.5	12.5	15	7	25	9.144	11.63	4.25	4.57
C3 - C4	900	274.32	6.5	12.5	22	11	25	9.144	11.63	4.25	4.57
LF		1505.3	6.5	12.5	120	60	25	9.144	11.63	4.25	4.57
	total miles	**1.56**									
Fly Ash to Landfill											
D2 - D1	700	213.36	6.5	12.5	17	17	13	9.144	5.81	4.25	4.57
D1 - C2	100	30.48	6.5	12.5	2	2	13	9.144	5.81	4.25	4.57
C2 - C3	600	182.88	6.5	12.5	15	7	25	9.144	11.63	4.25	4.57
C3 - C4	900	274.32	6.5	12.5	22	11	25	9.144	11.63	4.25	4.57
LF		1505.3	6.5	12.5	120	60	25	9.144	11.63	4.25	4.57
	total miles	**1.37**									

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ROAD HAUL LENGTH CALCULATIONS

Road ID	Length (ft)	Length (m)	Thickness (m)	Adjusted width (m)	Max Number of volume sources - N	volume sources modeled	Volume source spacing (m)	source height[a] (m)	sigma (y0)	sigma (z0)	Release Height (m)
Scrubber Sludge to Landfill											
D7 - D4	200	60.96	6.5	12.5	5	5	13	9.144	5.81	4.25	4.57
D4 - D3	300	91.44	6.5	12.5	7	7	13	9.144	5.81	4.25	4.57
D3 - D1	400	121.92	6.5	12.5	10	10	13	9.144	5.81	4.25	4.57
D1 - C2	100	30.48	6.5	12.5	2	2	13	9.144	5.81	4.25	4.57
C2 - C3	600	182.88	6.5	12.5	15	7	25	9.144	11.63	4.25	4.57
C3 - C4	900	274.32	6.5	12.5	22	11	25	9.144	11.63	4.25	4.57
LF		1505.3	6.5	12.5	120	60	25	9.144	11.63	4.25	4.57
	total miles	**1.41**									

Notes:
a Truck height assumed to be 15 ft.

Suggested Steps when modeling using the Texas Protocol:

1) Determine the adjusted width of the road. The adjusted width is the actual width plus 6 meters. The additional width represents turbulence caused by the vehicle as it moves along the road.
2) Determine the number of volume sources, N. Divide the length of the road by the adjusted width. The result is the maximum number of volume sources that could be used to represent the road.
3) Determine the height of the volume. The height is equal to twice the height of the vehicle generating the emissions.
4) Determine the initial horizontal sigma for each volume:
   a) If the road is represented by a single volume, divide the adjusted width by 4.3.
   b) If the road is represented by adjacent volumes, divide the adjusted width by 2.15.
   c) If the road is represented by alternating volumes, divide twice the adjusted width - measured from the center point of the first volume to the center point of the next volume - by 2.15.
5) Determine the initial vertical sigma. Divide the height of the volume determined in Step 3 by 2.15.
6) Determine the release point. Divide the height of the volume by two. This point is the center of the volume.
7) Determine the emission rate for each volume used to calculate the initial horizontal sigma in Step 4. Divide the total emission rate equally among the individual volumes used to represent the road.
8) Determine the UTM coordinate for the release point. The release point location is in the center of the base of the volume. This location must be at least one meter from the nearest receptor.

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ROAD HAUL APPORTIONMENT CALCULATIONS

Emissions by Road Segment

												average hours of operation	8760	4380
				Emissions (tpy)										
Haul Road	Source	X	Y	Limestone Haul Trucks	Soda Ash Haul Trucks	Lime Haul Trucks	Sorbent Haul Trucks	Magnesium Hydroxide Haul Trucks	Scrubber Sludge Hauled to Landfill	Fly Ash Hauled to Landfill	Bottom Ash Hauled to Landfill	Total Hauling (All Routes)	Annual Average Emission Rate (g/s)	Maximum Assumed Short Term Emission Rate[1] (g/s)
H8 - H6	H8_H6_1	691971	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_2	691946	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_3	691921	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_4	691896	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_5	691871	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_6	691846	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_7	691821	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_8	691796	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_9	691771	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_10	691746	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_11	691721	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_12	691696	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_13	691671	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_14	691646	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_15	691621	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_16	691596	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_17	691571	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_18	691546	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_19	691521	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_20	691496	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_21	691471	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_22	691446	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_23	691421	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_24	691396	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_25	691371	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_26	691346	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_27	691321	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_28	691296	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_29	691271	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_30	691246	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_31	691221	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_32	691196	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_33	691171	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_34	691146	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_35	691121	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_36	691096	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_37	691071	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_38	691046	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_39	691021	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_40	690996	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_41	690971	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_42	690946	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_43	690921	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_44	690896	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045

SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
ROAD HAUL APPORTIONMENT CALCULATIONS

Emissions by Road Segment				average hours of operation								8760	4380
				Emissions (tpy)									
Haul Road	Source	X	Y	Limestone Haul Trucks	Soda Ash Haul Trucks	Lime Haul Trucks	Sorbent Haul Trucks	Magnesium Hydroxide Haul Trucks	Scrubber Sludge Hauled to Landfill	Fly Ash Hauled to Landfill	Bottom Ash Hauled to Landfill	Total Hauling (All Routes)	Annual Average Emission Rate (g/s)	Maximum Assumed Short Term Emission Rate[1] (g/s)
H8 - H6 (Continued)	H8_H6_45	690871	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_46	690846	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_47	690821	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_48	690796	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_49	690771	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_50	690746	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_51	690721	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_52	690696	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_53	690671	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_54	690646	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_55	690621	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_56	690596	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_57	690571	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_58	690546	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_59	690521	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_60	690496	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_61	690471	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_62	690446	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_63	690421	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_64	690396	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_65	690371	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_66	690346	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_67	690321	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_68	690296	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_69	690271	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_70	690246	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_71	690221	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_72	690196	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_73	690171	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_74	690146	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_75	690121	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_76	690096	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_77	690071	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_78	690071	4374082	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_79	690046	4374084	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_80	690022	4374090	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_81	689999	4374100	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_82	689977	4374113	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_83	689959	4374129	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_84	689943	4374149	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_85	689930	4374170	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_86	689921	4374194	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_87	689916	4374218	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H8_H6_88	689915	4374243	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045

SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
ROAD HAUL APPORTIONMENT CALCULATIONS

Emissions by Road Segment

				average hours of operation								8760	4380
				Emissions (tpy)									
Haul Road	Source	X	Y	Limestone Haul Trucks	Soda Ash Haul Trucks	Lime Haul Trucks	Sorbent Haul Trucks	Magnesium Hydroxide Haul Trucks	Scrubber Sludge Hauled to Landfill	Fly Ash Hauled to Landfill	Bottom Ash Hauled to Landfill	Total Hauling (All Routes)	Annual Average Emission Rate (g/s)	Maximum Assumed Short Term Emission Rate[1] (g/s)
H6 - H3	H6_H3_1	689915	4374268	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H6_H3_2	689915	4374293	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H6_H3_3	689915	4374318	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H6_H3_4	689915	4374343	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H6_H3_5	689915	4374368	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H6_H3_6	689915	4374393	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H6_H3_7	689915	4374418	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H6_H3_8	689915	4374443	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H6_H3_9	689915	4374468	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H6_H3_10	689915	4374493	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H6_H3_11	689915	4374518	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
H3 - H4	H3_H4_1	689915	4374535	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H3_H4_2	689928	4374535	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H3_H4_3	689941	4374535	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H3_H4_4	689954	4374535	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
H4 - G2	H4_G2_1	689957	4374535	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H4_G2_2	689957	4374548	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H4_G2_3	689957	4374561	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H4_G2_4	689957	4374574	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	H4_G2_5	689957	4374587	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
G2 - F1	G2_F1_1	689957	4374592	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	G2_F1_2	689957	4374605	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	G2_F1_3	689957	4374618	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	G2_F1_4	689957	4374631	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	G2_F1_5	689957	4374644	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	G2_F1_6	689957	4374657	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	G2_F1_7	689957	4374670	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	G2_F1_8	689957	4374683	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
F1 - E3	F1_E3_1	689957	4374694	0.003	0.001	0.002	0.002	0.000		0.023		0.03	0.00090	0.00180
	F1_E3_2	689957	4374707	0.003	0.001	0.002	0.002	0.000		0.023		0.03	0.00090	0.00180
	F1_E3_3	689957	4374720	0.003	0.001	0.002	0.002	0.000		0.023		0.03	0.00090	0.00180
	F1_E3_4	689957	4374733	0.003	0.001	0.002	0.002	0.000		0.023		0.03	0.00090	0.00180
	F1_E3_5	689957	4374746	0.003	0.001	0.002	0.002	0.000		0.023		0.03	0.00090	0.00180
E3 - E1	E3_E1_1	689957	4374748	0.003	0.001	0.002	0.002	0.000		0.023		0.03	0.00090	0.00180
	E3_E1_2	689957	4374765	0.003	0.001	0.002	0.002	0.000		0.023		0.03	0.00090	0.00180
	E3_E1_3	689957	4374778	0.003	0.001	0.002	0.002	0.000		0.023		0.03	0.00090	0.00180
	E3_E1_4	689957	4374791	0.003	0.001	0.002	0.002	0.000		0.023		0.03	0.00090	0.00180
	E3_E1_5	689957	4374804	0.003	0.001	0.002	0.002	0.000		0.023		0.03	0.00090	0.00180
	E3_E1_6	689957	4374817	0.003	0.001	0.002	0.002	0.000		0.023		0.03	0.00090	0.00180
	E3_E1_7	689957	4374830	0.003	0.001	0.002	0.002	0.000		0.023		0.03	0.00090	0.00180
	E3_E1_8	689957	4374843	0.003	0.001	0.002	0.002	0.000		0.023		0.03	0.00090	0.00180

SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
ROAD HAUL APPORTIONMENT CALCULATIONS

Emissions by Road Segment

				average hours of operation								8760	4380
				Emissions (tpy)									
Haul Road	Source	X	Y	Limestone Haul Trucks	Soda Ash Haul Trucks	Lime Haul Trucks	Sorbent Haul Trucks	Magnesium Hydroxide Haul Trucks	Scrubber Sludge Hauled to Landfill	Fly Ash Hauled to Landfill	Bottom Ash Hauled to Landfill	Total Hauling (All Routes)	Annual Average Emission Rate (g/s)	Maximum Assumed Short Term Emission Rate[1] (g/s)
E1 - D3	E1_D3_1	689957	4374853	0.003	0.001	0.002	0.002	0.000		0.023		0.03	0.00090	0.00180
	E1_D3_2	689957	4374866	0.003	0.001	0.002	0.002	0.000		0.023		0.03	0.00090	0.00180
	E1_D3_3	689957	4374879	0.003	0.001	0.002	0.002	0.000		0.023		0.03	0.00090	0.00180
	E1_D3_4	689957	4374892	0.003	0.001	0.002	0.002	0.000		0.023		0.03	0.00090	0.00180
	E1_D3_5	689959	4374905	0.003	0.001	0.002	0.002	0.000		0.023		0.03	0.00090	0.00180
	E1_D3_6	689966	4374916	0.003	0.001	0.002	0.002	0.000		0.023		0.03	0.00090	0.00180
D3 - D4	D3_D4_1	689967	4374918	0.003	0.001	0.002	0.002	0.000	0.013			0.02	0.00060	0.00120
	D3_D4_2	689979	4374918	0.003	0.001	0.002	0.002	0.000	0.013			0.02	0.00060	0.00120
	D3_D4_3	689992	4374918	0.003	0.001	0.002	0.002	0.000	0.013			0.02	0.00060	0.00120
	D3_D4_4	690005	4374918	0.003	0.001	0.002	0.002	0.000	0.013			0.02	0.00060	0.00120
	D3_D4_5	690018	4374918	0.003	0.001	0.002	0.002	0.000	0.013			0.02	0.00060	0.00120
	D3_D4_6	690031	4374918	0.003	0.001	0.002	0.002	0.000	0.013			0.02	0.00060	0.00120
	D3_D4_7	690044	4374918	0.003	0.001	0.002	0.002	0.000	0.013			0.02	0.00060	0.00120
	D3_D4_8	690057	4374918	0.003	0.001	0.002	0.002	0.000	0.013			0.02	0.00060	0.00120
D4 - D5	D4_D5_1	690062	4374918	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	D4_D5_2	690075	4374918	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	D4_D5_3	690088	4374918	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	D4_D5_4	690101	4374918	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	D4_D5_5	690114	4374918	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	D4_D5_6	690127	4374918	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	D4_D5_7	690140	4374918	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	D4_D5_8	690153	4374918	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
D5 - D8	D5_D8_1	690154	4374918	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	D5_D8_2	690154	4374905	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	D5_D8_3	690154	4374892	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	D5_D8_4	690154	4374879	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	D5_D8_5	690154	4374866	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	D5_D8_6	690154	4374853	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
	D5_D8_7	690154	4374842	0.003	0.001	0.002	0.002	0.000				0.01	0.00023	0.00045
D7 - D4	D7_D4_1	690062	4374842						0.013			0.01	0.00038	0.00075
	D7_D4_2	690062	4374853						0.013			0.01	0.00038	0.00075
	D7_D4_3	690062	4374866						0.013			0.01	0.00038	0.00075
	D7_D4_4	690062	4374879						0.013			0.01	0.00038	0.00075
	D7_D4_5	690062	4374892						0.013			0.01	0.00038	0.00075
	D7_D4_6	690062	4374905						0.013			0.01	0.00038	0.00075
	D7_D4_7	690062	4374918						0.013			0.01	0.00038	0.00075
F2 - F1	F2_F1_1	690104	4374694							0.023		0.02	0.00068	0.00135
	F2_F1_2	690079	4374694							0.023		0.02	0.00068	0.00135
	F2_F1_3	690054	4374694							0.023		0.02	0.00068	0.00135
	F2_F1_4	690029	4374694							0.023		0.02	0.00068	0.00135
	F2_F1_5	690004	4374694							0.023		0.02	0.00068	0.00135
	F2_F1_6	689979	4374694							0.023		0.02	0.00068	0.00135

SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
ROAD HAUL APPORTIONMENT CALCULATIONS

Emissions by Road Segment

				average hours of operation								8760	4380
				Emissions (tpy)									
Haul Road	Source	X	Y	Limestone Haul Trucks	Soda Ash Haul Trucks	Lime Haul Trucks	Sorbent Haul Trucks	Magnesium Hydroxide Haul Trucks	Scrubber Sludge Hauled to Landfill	Fly Ash Hauled to Landfill	Bottom Ash Hauled to Landfill	Total Hauling (All Routes)	Annual Average Emission Rate (g/s)	Maximum Assumed Short Term Emission Rate[1] (g/s)
D3 - D1	D3_D1_1	689967	4374918						0.013	0.023		0.04	0.00105	0.00210
	D3_D1_2	689975	4374926						0.013	0.023		0.04	0.00105	0.00210
	D3_D1_3	689984	4374936						0.013	0.023		0.04	0.00105	0.00210
	D3_D1_4	689993	4374945						0.013	0.023		0.04	0.00105	0.00210
	D3_D1_5	690003	4374954						0.013	0.023		0.04	0.00105	0.00210
	D3_D1_6	690012	4374963						0.013	0.023		0.04	0.00105	0.00210
	D3_D1_7	690021	4374972						0.013	0.023		0.04	0.00105	0.00210
	D3_D1_8	690030	4374981						0.013	0.023		0.04	0.00105	0.00210
	D3_D1_9	690039	4374991						0.013	0.023		0.04	0.00105	0.00210
D2 - D1	D2_D1_1	690061	4374999								0.008	0.01	0.00023	0.00045
	D2_D1_2	690074	4374999								0.008	0.01	0.00023	0.00045
	D2_D1_3	690087	4374999								0.008	0.01	0.00023	0.00045
	D2_D1_4	690100	4374999								0.008	0.01	0.00023	0.00045
	D2_D1_5	690113	4374999								0.008	0.01	0.00023	0.00045
	D2_D1_6	690126	4374999								0.008	0.01	0.00023	0.00045
	D2_D1_7	690139	4374999								0.008	0.01	0.00023	0.00045
	D2_D1_8	690152	4374999								0.008	0.01	0.00023	0.00045
	D2_D1_9	690165	4374999								0.008	0.01	0.00023	0.00045
	D2_D1_10	690178	4374999								0.008	0.01	0.00023	0.00045
	D2_D1_11	690191	4374999								0.008	0.01	0.00023	0.00045
	D2_D1_12	690204	4374999								0.008	0.01	0.00023	0.00045
	D2_D1_13	690217	4374999								0.008	0.01	0.00023	0.00045
	D2_D1_14	690230	4374999								0.008	0.01	0.00023	0.00045
	D2_D1_15	690243	4374999								0.008	0.01	0.00023	0.00045
	D2_D1_16	690248	4374999								0.008	0.01	0.00023	0.00045
D1 - C2	D1_C2_1	690048	4374999						0.013	0.023	0.008	0.04	0.00128	0.00255
	D1_C2_2	690048	4375012						0.013	0.023	0.008	0.04	0.00128	0.00255
	D1_C2_3	690048	4375025						0.013	0.023	0.008	0.04	0.00128	0.00255
	D1_C2_4	690048	4375038						0.013	0.023	0.008	0.04	0.00128	0.00255
	D1_C2_5	690048	4375051						0.013	0.023	0.008	0.04	0.00128	0.00255
C2 - C3	C2_C3_1	690048	4375057						0.013	0.023	0.008	0.04	0.00128	0.00255
	C2_C3_2	690073	4375057						0.013	0.023	0.008	0.04	0.00128	0.00255
	C2_C3_3	690098	4375057						0.013	0.023	0.008	0.04	0.00128	0.00255
	C2_C3_4	690123	4375057						0.013	0.023	0.008	0.04	0.00128	0.00255
	C2_C3_5	690148	4375057						0.013	0.023	0.008	0.04	0.00128	0.00255
	C2_C3_6	690173	4375057						0.013	0.023	0.008	0.04	0.00128	0.00255
	C2_C3_7	690198	4375057						0.013	0.023	0.008	0.04	0.00128	0.00255
	C2_C3_8	690223	4375057						0.013	0.023	0.008	0.04	0.00128	0.00255
	C2_C3_9	690248	4375057						0.013	0.023	0.008	0.04	0.00128	0.00255

SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
ROAD HAUL APPORTIONMENT CALCULATIONS

Emissions by Road Segment

				average hours of operation								8760	4380
				Emissions (tpy)									
Haul Road	Source	X	Y	Limestone Haul Trucks	Soda Ash Haul Trucks	Lime Haul Trucks	Sorbent Haul Trucks	Magnesium Hydroxide Haul Trucks	Scrubber Sludge Hauled to Landfill	Fly Ash Hauled to Landfill	Bottom Ash Hauled to Landfill	Total Hauling (All Routes)	Annual Average Emission Rate (g/s)	Maximum Assumed Short Term Emission Rate[1] (g/s)
C3 - C4	C3_C4_1	690248	4375057						0.013	0.023	0.008	0.04	0.00128	0.00255
	C3_C4_2	690248	4375082						0.013	0.023	0.008	0.04	0.00128	0.00255
	C3_C4_3	690248	4375107						0.013	0.023	0.008	0.04	0.00128	0.00255
	C3_C4_4	690248	4375132						0.013	0.023	0.008	0.04	0.00128	0.00255
	C3_C4_5	690249	4375157						0.013	0.023	0.008	0.04	0.00128	0.00255
	C3_C4_6	690251	4375182						0.013	0.023	0.008	0.04	0.00128	0.00255
	C3_C4_7	690256	4375207						0.013	0.023	0.008	0.04	0.00128	0.00255
	C3_C4_8	690262	4375231						0.013	0.023	0.008	0.04	0.00128	0.00255
	C3_C4_9	690268	4375255						0.013	0.023	0.008	0.04	0.00128	0.00255
	C3_C4_10	690274	4375279						0.013	0.023	0.008	0.04	0.00128	0.00255
Landfill	LF_1	690281	4375305						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_2	690293	4375327						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_3	690310	4375345						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_4	690329	4375361						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_5	690345	4375379						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_6	690358	4375401						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_7	690365	4375424						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_8	690367	4375449						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_9	690368	4375474						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_10	690368	4375499						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_11	690368	4375524						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_12	690368	4375549						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_13	690368	4375574						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_14	690369	4375599						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_15	690369	4375624						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_16	690369	4375649						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_17	690369	4375674						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_18	690369	4375699						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_19	690369	4375724						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_20	690366	4375749						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_21	690362	4375774						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_22	690357	4375798						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_23	690350	4375822						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_24	690343	4375846						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_25	690334	4375869						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_26	690322	4375891						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_27	690311	4375913						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_28	690298	4375935						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_29	690284	4375956						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_30	690270	4375976						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_31	690254	4375995						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_32	690236	4376013						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_33	690219	4376031						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_34	690199	4376047						0.013	0.023	0.008	0.04	0.00128	0.00255

SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
ROAD HAUL APPORTIONMENT CALCULATIONS

Emissions by Road Segment

				average hours of operation								8760	4380
				Emissions (tpy)									
Haul Road	Source	X	Y	Limestone Haul Trucks	Soda Ash Haul Trucks	Lime Haul Trucks	Sorbent Haul Trucks	Magnesium Hydroxide Haul Trucks	Scrubber Sludge Hauled to Landfill	Fly Ash Hauled to Landfill	Bottom Ash Hauled to Landfill	Total Hauling (All Routes)	Annual Average Emission Rate (g/s)	Maximum Assumed Short Term Emission Rate[1] (g/s)
Landfill (Continued)	LF_35	690179	4376062						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_36	690159	4376077						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_37	690138	4376090						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_38	690117	4376103						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_39	690094	4376114						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_40	690070	4376120						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_41	690046	4376127						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_42	690022	4376134						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_43	689998	4376141						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_44	689974	4376147						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_45	689949	4376149						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_46	689924	4376149						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_47	689899	4376149						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_48	689874	4376149						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_49	689849	4376149						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_50	689824	4376149						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_51	689799	4376149						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_52	689774	4376149						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_53	689749	4376149						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_54	689724	4376149						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_55	689699	4376149						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_56	689674	4376149						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_57	689649	4376149						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_58	689624	4376149						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_59	689599	4376149						0.013	0.023	0.008	0.04	0.00128	0.00255
	LF_60	689574	4376149						0.013	0.023	0.008	0.04	0.00128	0.00255

1 - Maximum short term emissions were estimated as twice the annual averaged emission rate. This was accomplished by assuming maximum daily emissions occurred over a 12 hour period, as opposed to a 24 hour period.

A6-56
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **FE-1**
Emission Source: **Secondary Fuel/Startup and Emergency Power - 2,000,000 gallon diesel tank**
Pollutants: **VOC**

see pdf

A6-57
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **FE-2**
Emission Source: **Rail Power Refueling - 1,000,000 gallon diesel tank**
Pollutants: **VOC**

see pdf

A6-58
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **FE-3**
Emission Source: **Burner Supply - 60,000 gallon diesel tank**
Pollutants: **VOC**

see pdf

A6-59
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **FE-4**
Emission Source: **Burner Supply - 60,000 gallon diesel tank**
Pollutants: **VOC**

see pdf

A6-60
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **FE-5**
Emission Source: **Auxiliary Boiler/Emergency Generator - 15,000 gallon diesel tank**
Pollutants: **VOC**

see pdf

A6-6 1
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **FE-6**
Emission Source: **Main Fire Water Pump - 700 gallon diesel tank**
Pollutants: **VOC**

see pdf

A6-62
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **FE-7**
Emission Source: **Booster Fire Water Pump - 200 gallon diesel tank**
Pollutants: **VOC**

see pdf

A6-63
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **FE-8**
Emission Source: **Emergency Quench Water Pump - 700 gallon diesel tank**
Pollutants: **VOC**

see pdf

A6-64
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **FE-9**
Emission Source: **Switchyard Backup Power Supply - 700 gallon diesel tank**
Pollutants: **VOC**

see pdf

A6-65
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **FE-10**
Emission Source: **Coal Yard Equipment Fueling - 25,000 gallon diesel tank**
Pollutants: **VOC**

see pdf

A6-66
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **FE-11**
Emission Source: **Ash Haul Truck/Light Vehicle Fueling - 15,000 gallon diesel tank**
Pollutants: **VOC**

see pdf

A6-67
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
EMISSIONS CALCULATIONS

Source Name: **FE-12**
Emission Source: **Ash Haul Truck/Light Vehicle Fueling - 15,000 gallon gasoline tank**
Pollutants: **VOC**

see pdf

A6-68
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
BOILER EMISSIONS (NON-CRITERIA POLLUTANTS)

		Maximum Emissions Case (one boiler)	Maximum Emissions Case (two boilers)	Pollutant Form	Pollutant Class	Chemical Abstract Services (CAS) Number
PLANT PERFORMANCE:						
Net Plant Output	Net-kW	849,756	1,699,512			
Primary Fuel Feed Rate	Tons/hr	538	1,075			
Heat input to Boiler	mmBtu/hr	8,710	17,420			
PLANT EMISSION ANALYSIS:						
Polychlorinated Dibenzo-P-Dioxins and Polychlorinated Dibenzofurans[1]						
Total TCDD	lb/ton	3.9E-10	3.9E-10	Particulate		
	lb/hr	2.1E-07	4.2E-07			
	tons/year	9.3E-07	1.9E-06			
Total PeCDD	lb/ton	7.1E-10	7.1E-10	Particulate		
	lb/hr	3.8E-07	7.6E-07			
	tons/year	1.7E-06	3.3E-06			
Total HxCDD	lb/ton	3.0E-09	3.0E-09	Particulate		
	lb/hr	1.6E-06	3.2E-06			
	tons/year	7.1E-06	1.4E-05			
Total HpCDD	lb/ton	1.0E-08	1.0E-08	Particulate		
	lb/hr	5.4E-06	1.1E-05			
	tons/year	2.4E-05	4.7E-05			
Total OCDD	lb/ton	2.9E-08	2.9E-08	Particulate		
	lb/hr	1.5E-05	3.1E-05			
	tons/year	6.8E-05	1.4E-04			
Total PCDD[2]	lb/ton	4.3E-08	4.3E-08	Particulate		
	lb/hr	2.3E-05	4.6E-05			
	tons/year	1.0E-04	2.0E-04			
Total TCDF	lb/ton	2.5E-09	2.5E-09	Particulate		
	lb/hr	1.3E-06	2.7E-06			
	tons/year	5.9E-06	1.2E-05			
Total PeCDF	lb/ton	4.8E-09	4.8E-09	Particulate		
	lb/hr	2.6E-06	5.2E-06			
	tons/year	1.1E-05	2.3E-05			
Total HxCDF	lb/ton	1.3E-08	1.3E-08	Particulate		
	lb/hr	6.8E-06	1.4E-05			
	tons/year	3.0E-05	6.0E-05			
Total HpCDF	lb/ton	4.4E-08	4.4E-08	Particulate		
	lb/hr	2.4E-05	4.7E-05			
	tons/year	1.0E-04	2.1E-04			
Total OCDF	lb/ton	1.4E-07	1.4E-07	Particulate		
	lb/hr	7.4E-05	1.5E-04			
	tons/year	3.2E-04	6.5E-04			
Total PCDF[2]	lb/ton	2.0E-07	2.0E-07	Particulate		
	lb/hr	1.1E-04	2.2E-04			
	tons/year	4.7E-04	9.5E-04			
Total PCDD[2]/PCDF[2]	**lb/ton**	**2.4E-07**	**2.4E-07**	**Particulate**		
	lb/hr	**1.3E-04**	**2.6E-04**			
	tons/year	**5.7E-04**	**1.1E-03**			

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SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
BOILER EMISSIONS (NON-CRITERIA POLLUTANTS)

		Maximum Emissions Case (one boiler)	Maximum Emissions Case (two boilers)	Pollutant Form	Pollutant Class	Chemical Abstract Services (CAS) Number
PAHs[3]						
Acenaphthene	lb/ton	5.1E-07	5.1E-07	Particulate	Organic	83-32-9
	lb/hr	2.7E-04	5.5E-04			
	tons/year	1.2E-03	2.4E-03			
Acenaphthylene	lb/ton	2.5E-07	2.5E-07	Particulate	Organic	208-96-8
	lb/hr	1.3E-04	2.7E-04			
	tons/year	5.9E-04	1.2E-03			
Anthracene	lb/ton	2.1E-07	2.1E-07	Particulate	Organic	120-12-7
	lb/hr	1.1E-04	2.3E-04			
	tons/year	4.9E-04	9.9E-04			
Benzo(a)anthracene	lb/ton	8.0E-08	8.0E-08	Particulate	Organic	56-55-3
	lb/hr	4.3E-05	8.6E-05			
	tons/year	1.9E-04	3.8E-04			
Benzo(a)pyrene	lb/ton	3.8E-08	3.8E-08	Particulate	Organic	50-32-8
	lb/hr	2.0E-05	4.1E-05			
	tons/year	8.9E-05	1.8E-04			
Benzo(b,j,k)fluoranthene	lb/ton	1.1E-07	1.1E-07	Particulate	Organic	205-99-2,
	lb/hr	5.9E-05	1.2E-04			205-82-3,
	tons/year	2.6E-04	5.2E-04			207-08-9
Benzo(g,h,i)perylene	lb/ton	2.7E-08	2.7E-08	Particulate	Organic	191-24-2
	lb/hr	1.5E-05	2.9E-05			
	tons/year	6.4E-05	1.3E-04			
Chrysene	lb/ton	1.0E-07	1.0E-07	Particulate	Organic	218-01-9
	lb/hr	5.4E-05	1.1E-04			
	tons/year	2.4E-04	4.7E-04			
Fluoranthene	lb/ton	7.1E-07	7.1E-07	Particulate	Organic	206-44-0
	lb/hr	3.8E-04	7.6E-04			
	tons/year	1.7E-03	3.3E-03			
Fluorene	lb/ton	9.1E-07	9.1E-07	Particulate	Organic	86-73-7
	lb/hr	4.9E-04	9.8E-04			
	tons/year	2.1E-03	4.3E-03			
Indeno(1,2,3-cd)pyrene	lb/ton	6.1E-08	6.1E-08	Particulate	Organic	193-39-5
	lb/hr	3.3E-05	6.6E-05			
	tons/year	1.4E-04	2.9E-04			
5-Methyl chrysene	lb/ton	2.2E-08	2.2E-08	Particulate	Organic	3697-24-3
	lb/hr	1.2E-05	2.4E-05			
	tons/year	5.2E-05	1.0E-04			
Phenanthrene	lb/ton	2.7E-06	2.7E-06	Particulate	Organic	85-01-8
	lb/hr	1.5E-03	2.9E-03			
	tons/year	6.4E-03	1.3E-02			
Pyrene	lb/ton	3.3E-07	3.3E-07	Particulate	Organic	129-00-0
	lb/hr	1.8E-04	3.5E-04			
	tons/year	7.8E-04	1.6E-03			
Total PAH	**lb/hr**	**3.3E-03**	**6.5E-03**			
	tons/year	**1.4E-02**	**2.9E-02**			

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SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
BOILER EMISSIONS (NON-CRITERIA POLLUTANTS)

		Maximum Emissions Case (one boiler)	Maximum Emissions Case (two boilers)	Pollutant Form	Pollutant Class	Chemical Abstract Services (CAS) Number
Organic HAPs[4]						
Acetaldehyde	lb/ton	5.7E-04	5.7E-04	Vapor	Organic	75-07-0
	lb/hr	0.306	0.613			
	tons/year	1.342	2.685			
Acetophenone	lb/ton	1.5E-05	1.5E-05	Vapor	Organic	98-86-2
	lb/hr	0.008	0.016			
	tons/year	0.035	0.071			
Acrolein	lb/ton	2.9E-04	2.9E-04	Vapor	Organic	107-02-8
	lb/hr	0.156	0.312			
	tons/year	0.683	1.366			
Benzene	lb/ton	1.3E-03	1.3E-03	Vapor	Organic	71-43-2
	lb/hr	0.699	1.398			
	tons/year	3.061	6.123			
Benzyl chloride	lb/ton	7.0E-04	7.0E-04	Vapor	Organic	100-44-7
	lb/hr	0.376	0.753			
	tons/year	1.648	3.297			
Biphenyl	lb/ton	1.7E-06	1.7E-06	Vapor	Organic	92-52-4
(also PAH, not included in total	lb/hr	9.1E-04	1.8E-03			
PAHs)	tons/year	4.0E-03	8.0E-03			
Bis(2-ethylhexyl)phthalate (DEHP	lb/ton	7.3E-05	7.3E-05	Particulate	Organic	117-81-7
	lb/hr	0.039	0.078			
	tons/year	0.172	0.344			
Bromoform	lb/ton	3.9E-05	3.9E-05	Vapor	Organic	75-25-2
	lb/hr	0.021	0.042			
	tons/year	0.092	0.184			
Carbon disulfide	lb/ton	1.3E-04	1.3E-04	Vapor	Inorganic	75-15-0
	lb/hr	0.070	0.140			
	tons/year	0.306	0.612			
2-Chloroacetophenone	lb/ton	7.0E-06	7.0E-06	Particulate	Organic	532-27-4
	lb/hr	3.8E-03	7.5E-03			
	tons/year	1.6E-02	3.3E-02			
Chlorobenzene	lb/ton	2.2E-05	2.2E-05	Vapor	Organic	108-90-7
	lb/hr	1.2E-02	2.4E-02			
	tons/year	0.052	0.104			
Chloroform	lb/ton	5.9E-05	5.9E-05	Vapor	Organic	67-66-3
	lb/hr	0.032	0.063			
	tons/year	0.139	0.278			
Cumene	lb/ton	5.3E-06	5.3E-06	Vapor	Organic	98-82-8
	lb/hr	2.8E-03	5.7E-03			
	tons/year	1.2E-02	2.5E-02			
Cyanide	lb/ton	2.5E-03	2.5E-03	Vapor	Organic	77-78-1
(no longer a HAP, not included in	lb/hr	1.3E+00	2.7E+00			
total)	tons/year	5.887	11.775			
Dimethyl sulfate	lb/ton	4.8E-05	4.8E-05	Vapor	Organic	77-78-1
	lb/hr	2.6E-02	5.2E-02			
	tons/year	0.113	0.226			

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SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
BOILER EMISSIONS (NON-CRITERIA POLLUTANTS)

		Maximum Emissions Case (one boiler)	Maximum Emissions Case (two boilers)	Pollutant Form	Pollutant Class	Chemical Abstract Services (CAS) Number
2,4-Dinitrotoluene	lb/ton	2.8E-07	2.8E-07	Particulate	Organic	121-14-2
	lb/hr	1.5E-04	3.0E-04			
	tons/year	6.6E-04	1.3E-03			
Ethyl benzene	lb/ton	9.4E-05	9.4E-05	Vapor	Organic	100-41-4
	lb/hr	0.051	0.101			
	tons/year	0.221	0.443			
Ethyl chloride	lb/ton	4.2E-05	4.2E-05	Vapor	Organic	75-00-3
	lb/hr	2.3E-02	4.5E-02			
	tons/year	0.099	0.198			
Ethylene dichloride	lb/ton	4.0E-05	4.0E-05	Vapor	Organic	107-06-2
	lb/hr	2.2E-02	4.3E-02			
	tons/year	0.094	0.188			
Ethylene dibromide	lb/ton	1.2E-06	1.2E-06	Vapor	Organic	106-93-4
	lb/hr	6.5E-04	1.3E-03			
	tons/year	2.8E-03	5.7E-03			
Formaldehyde	lb/ton	2.4E-04	2.4E-04	Vapor	Organic	50-00-0
	lb/hr	0.129	0.258			
	tons/year	0.565	1.130			
Hexane	lb/ton	6.7E-05	6.7E-05	Vapor	Organic	110-54-3
	lb/hr	0.036	0.072			
	tons/year	0.158	0.316			
Isophorone	lb/ton	5.8E-04	5.8E-04	Vapor	Organic	78-59-1
	lb/hr	0.312	0.624			
	tons/year	1.366	2.732			
Methyl bromide	lb/ton	1.6E-04	1.6E-04	Vapor	Organic	74-83-9
	lb/hr	0.086	0.172			
	tons/year	0.377	0.754			
Methyl chloride	lb/ton	5.3E-04	5.3E-04	Vapor	Organic	74-87-3
	lb/hr	0.285	0.570			
	tons/year	1.248	2.496			
Methyl ethyl ketone	lb/ton	3.9E-04	3.9E-04	Vapor	Organic	74-87-3
(no longer a HAP, not included in	lb/hr	0.210	0.419			
total)	tons/year	0.918	1.837			
Methyl hydrazine	lb/ton	1.7E-04	1.7E-04	Vapor	Organic	60-34-4
	lb/hr	0.091	0.183			
	tons/year	0.400	0.801			
Methyl methacrylate	lb/ton	2.0E-05	2.0E-05	Vapor	Organic	80-62-6
	lb/hr	1.1E-02	2.2E-02			
	tons/year	0.047	0.094			
Methyl tert butyl ether	lb/ton	3.5E-05	3.5E-05	Vapor	Organic	1634-04-4
	lb/hr	1.9E-02	3.8E-02			
	tons/year	0.082	0.165			
Methylene chloride	lb/ton	2.9E-04	2.9E-04	Vapor	Organic	75-09-2
	lb/hr	0.156	0.312			
	tons/year	0.236	0.236			

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SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
BOILER EMISSIONS (NON-CRITERIA POLLUTANTS)

		Maximum Emissions Case (one boiler)	Maximum Emissions Case (two boilers)	Pollutant Form	Pollutant Class	Chemical Abstract Services (CAS) Number
Naphthalene	lb/ton	1.3E-05	1.3E-05	Particulate	Organic	91-20-3
(also PAH, not included in total	lb/hr	7.0E-03	1.4E-02			
PAHs)	tons/year	3.1E-02	6.1E-02			
Phenol	lb/ton	1.6E-05	1.6E-05	Vapor	Organic	108-95-2
	lb/hr	8.6E-03	1.7E-02			
	tons/year	0.038	0.075			
Propionaldehyde	lb/ton	3.8E-04	3.8E-04	Vapor	Organic	123-38-6
	lb/hr	0.204	0.409			
	tons/year	0.895	1.790			
Styrene	lb/ton	2.5E-05	2.5E-05	Vapor	Organic	100-42-5
	lb/hr	1.3E-02	2.7E-02			
	tons/year	0.059	0.118			
Tetrachloroethylene	lb/ton	4.3E-05	4.3E-05	Vapor	Organic	127-18-4
	lb/hr	2.3E-02	4.6E-02			
	tons/year	0.101	0.203			
Toluene	lb/ton	2.4E-04	2.4E-04	Vapor	Organic	108-88-3
	lb/hr	0.129	0.258			
	tons/year	0.565	1.130			
1,1,1-Trichloroethane (Methyl	lb/ton	2.0E-05	2.0E-05	Vapor	Organic	71-55-6
chloroform)	lb/hr	1.1E-02	2.2E-02			
	tons/year	0.047	0.094			
Vinyl acetate	lb/ton	7.6E-06	7.6E-06	Vapor	Organic	108-05-4
	lb/hr	4.1E-03	8.2E-03			
	tons/year	1.8E-02	3.6E-02			
Xylenes	lb/ton	3.7E-05	3.7E-05	Vapor	Organic	1330-20-7
	lb/hr	2.0E-02	4.0E-02			
	tons/year	0.087	0.174			
Total Organic HAPs	**lb/hr**	**3.4**	**6.8**			
	tons/year	**14.4**	**28.6**			

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SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
BOILER EMISSIONS (NON-CRITERIA POLLUTANTS)

		Maximum Emissions Case (one boiler)	Maximum Emissions Case (two boilers)	Pollutant Form	Pollutant Class	Chemical Abstract Services (CAS) Number
Inorganic HAPs[5]						
Antimony	lb/ton	1.8E-05	1.8E-05	Particulate	Inorganic	7440-36-0
	lb/hr	0.010	0.019			
	tons/year	0.042	0.085			
Arsenic	lb/ton	4.1E-04	4.1E-04	Particulate	Inorganic	7440-38-2
	lb/hr	0.220	0.441			
	tons/year	0.966	1.931			
Beryllium	lb/ton	2.1E-05	2.1E-05	Particulate	Inorganic	7440-41-7
	lb/hr	0.011	0.023			
	tons/year	0.049	0.099			
Cadmium	lb/ton	5.1E-05	5.1E-05	Particulate	Inorganic	7440-43-9
	lb/hr	0.027	0.055			
	tons/year	0.120	0.240			
Chromium	lb/ton	2.6E-04	2.6E-04	Particulate	Inorganic	7440-47-3
	lb/hr	0.140	0.280			
	tons/year	0.612	1.225			
Chromium (VI)	lb/ton	7.9E-05	7.9E-05	Particulate	Inorganic	18540-29-9
	lb/hr	0.042	0.085			
	tons/year	0.186	0.372			
Cobalt	lb/ton	1.0E-04	1.0E-04	Particulate	Inorganic	7440-48-4
	lb/hr	0.054	0.108			
	tons/year	0.235	0.471			
Hydrogen chloride[6]	lb/ton	1.2E+00	1.2E+00	Vapor	Inorganic	7647-01-0
	control (%)	85.0%	85.0%			
	lb/hr	9.678E+01	1.9E+02			
	tons/year	423.9	847.8			
Hydrogen fluoride[7]	lb/mmBtu	4.0E-04	4.0E-04	Vapor	Inorganic	73602-61-6
	lb/hr	3.5	7.0			
	tons/year	15.3	30.5			
Lead	lb/ton	4.2E-04	4.2E-04	Particulate	Inorganic	7439-92-1
	lb/hr	0.226	0.452			
	tons/year	0.989	1.978			
Manganese	lb/ton	4.9E-04	4.9E-04	Particulate	Inorganic	7439-96-5
	lb/hr	0.263	0.527			
	tons/year	1.154	2.308			
Mercury[8]	lb/MWh	2.00E-05	2.00E-05	Vapor/ Particulate	Inorganic	7439-97-6
	lb/hr	0.017	0.034			
	tons/year	0.074	0.149			
Nickel	lb/ton	2.8E-04	2.8E-04	Particulate	Inorganic	7440-02-0
	lb/hr	0.151	0.301			
	tons/year	0.659	1.319			
Selenium	lb/ton	1.3E-03	1.3E-03	Particulate	Inorganic	7782-49-2
	lb/hr	0.699	1.398			
	tons/year	3.061	6.123			
Total Inorganic HAPs	**lb/hr**	**102.1**	**204.2**			
	tons/year	**447.3**	**894.6**			

A6-68
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
BOILER EMISSIONS (NON-CRITERIA POLLUTANTS)

		Maximum Emissions Case (one boiler)	Maximum Emissions Case (two boilers)	Pollutant Form	Pollutant Class	Chemical Abstract Services (CAS) Number
Total HAPs	**lb/hr**	**105.5**	**211.0**			
	tons/year	**461.7**	**923.2**			

STACK PARAMETERS:

Stack Flue Gas Temperature	324	K	
Stack Flue Gas Flow Rate	3,382,914	acfm	
Stack Flue Gas Flow Rate	2,246,137	scfm	
Exit Velocity	55	ft/s at 100%	(assume velocity is at actual conditions)
Height	727	ft	
Stack diameter (top ID)	36	ft	(each boiler stack)
Stack top area	1,023	ft2	
Ash Content	13	%	
Moisture Content	27.00	%	
Filterable PM_{10} emissions factor	0.010	lb/mmBtu	

Notes:

[1] Emission factors for Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans were found in AP-42 Table 1.1-12 "Emission Factors for Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans From Controlled Bituminous and Sub-bituminous Coal Combustion"

[2] Total PCDD is the sum of Total TCDD through Total OCDD. Total PCDF is the sum of Total TCDF through Total OCDF.

[3] Emission factors for Polynuclear Aromatic Hydrocarbons were found in AP-42 Table 1.1-13 "Emission Factors for Polynuclear Aromatic Hydrocarbons From Controlled Coal Combustion"

[4] Emission factors for Organic HAPs and other compounds were found in AP-42 Table 1.1-14 "Emission Factors for Various Organic Compounds From Controlled Coal Combustion"

[5] Emission factors for Trace Metals were found in AP-42 Table 1.1-18 "Emission Factors for Trace Metals From Controlled Coal Combustion"

[6] Emission factors for HCl were found in AP-42 Table 1.1-15 "Emission Factors for Hydrogen Chloride and Hydrogen Fluoride from Coal Combustion". Control efficiency of 85% for wet scrubber and baghouse per Sierra Pacific Power Company.

[7] Per Cummins & Barnard

[8] 20 E -6 lb/ MWh per Carl Weilert review of proposed Nevada Regulation R162-06: Clean Air Mercury Rule (CAMR) per Burns and McDonald.

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SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
AUXILIARY BOILER EMISSIONS NON-CRITERIA POLLUTANTS

Pollutant	Emission Factor	Units	Source	Hourly Emissions (lb/hr)	Annual Emissions (ton/yr)	Pollutant Form	Pollutant Class	Chemical Abstract Services (CAS) Number
Organic HAPs								
Formaldehyde[1]	6.10E-02	lb/10^3 Gal	AP-42 (9/98) Table 1.3-8	9.59E-02	4.20E-01	Vapor	Organic	50-00-0
Total Organic HAPs				9.59E-02	4.20E-01			
Inorganic HAPs								
Arsenic	4	lb/10^{12} Btu	AP-42 (9/98) Table 1.3-10	8.80E-04	3.85E-03	Particulate	Inorganic	7440-38-2
Beryllium	3	lb/10^{12} Btu	AP-42 (9/98) Table 1.3-10	6.60E-04	2.89E-03	Particulate	Inorganic	7440-41-7
Cadmium	3	lb/10^{12} Btu	AP-42 (9/98) Table 1.3-10	6.60E-04	2.89E-03	Particulate	Inorganic	7440-43-9
Chromium	3	lb/10^{12} Btu	AP-42 (9/98) Table 1.3-10	6.60E-04	2.89E-03	Particulate	Inorganic	7440-47-3
Lead	9	lb/10^{12} Btu	AP-42 (9/98) Table 1.3-10	1.98E-03	8.67E-03	Particulate	Inorganic	7439-92-1
Manganese	6	lb/10^{12} Btu	AP-42 (9/98) Table 1.3-10	1.32E-03	5.78E-03	Particulate	Inorganic	7439-96-5
Mercury	3	lb/10^{12} Btu	AP-42 (9/98) Table 1.3-10	6.60E-04	2.89E-03	Vapor/ Particulates	Inorganic	7439-97-6
Nickel	3	lb/10^{12} Btu	AP-42 (9/98) Table 1.3-10	6.60E-04	2.89E-03	Particulate	Inorganic	7440-02-0
Selenium	15	lb/10^{12} Btu	AP-42 (9/98) Table 1.3-10	3.30E-03	1.45E-02	Particulate	Inorganic	7782-49-2
Total Inorganic HAPs				1.08E-02	4.72E-02			
Total HAPs				1.07E-01	4.67E-01			
Other Pollutants								
Copper	6	lb/10^{12} Btu	AP-42 (9/98) Table 1.3-10	1.32E-03	5.78E-03	Particulate	Inorganic	7440-50-8
Zinc	4	lb/10^{12} Btu	AP-42 (9/98) Table 1.3-10	8.80E-04	3.85E-03	Particulate	Inorganic	7440-66-6

Sulfur Content of Fuel	0.0015%

STACK PARAMETERS:

Stack Flue Gas Temperature	350	°F	449.8 K
Stack Flue Gas Flow Rate	69,208	acfm	
Stack Flue Gas Flow Rate	33,129	scfm	
Exit Velocity	59.06	ft/sec	
Height	299.87	ft	
Stack diameter (top ID)	4.99	ft	
Stack area	19.53	ft2	

Maximum Fuel Firing Rate for Auxiliary Boiler:	220.0	mmBtu/hr
Heating Value for propane Fuel:	140,000	Btu/gal
Maximum Fuel Firing Rate:	1571.43	gal/hr
Estimated Maximum Annual Hours of Operation:	8,760	hours/year

Note:

1 - The emission factor for formaldehyde was obtained from AP-42 Table 1.3-8. This table provides a range for the emission factor of 0.035 to 0.061 lb/103 gal for distillate oil fired utility/industrial/commercial boilers. The higher emission factor was chosen for the calculation for conservativism.
Stack height of Auxiliary Boiler is assumed to be 10 ft above height of boiler buildings

Boiler heat input is assumed to be 140,000 lb/hr steam with 15% margin.

A6-70
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
PLANT DIESEL ENGINE AUXILIARY GENERATOR EMISSIONS NON-CRITERIA POLLUTANTS

Pollutant	Emission Factor	Units	Source	Hourly Emissions (lb/hr)	Annual Emissions (ton/yr)	Pollutant Form	Pollutant Class	Chemical Abstract Services (CAS) Number
PAHs								
Acenaphthene	4.68E-06	lb/mmBtu	AP-42 (10/96) Table 3.4-4	8.91E-05	1.11E-05	Particulate	Organic	83-32-9
Acenaphthylene	9.23E-06	lb/mmBtu	AP-42 (10/96) Table 3.4-4	1.76E-04	2.20E-05	Particulate	Organic	208-96-8
Anthracene	1.23E-06	lb/mmBtu	AP-42 (10/96) Table 3.4-4	2.34E-05	2.93E-06	Particulate	Organic	120-12-7
Benzo(a)anthracene	6.22E-07	lb/mmBtu	AP-42 (10/96) Table 3.4-4	1.18E-05	1.48E-06	Particulate	Organic	56-55-3
Benzo(a)pyrene	2.57E-07	lb/mmBtu	AP-42 (10/96) Table 3.4-4	4.89E-06	6.11E-07	Particulate	Organic	50-32-8
Benzo(b)fluoranthene	1.11E-06	lb/mmBtu	AP-42 (10/96) Table 3.4-4	2.11E-05	2.64E-06	Particulate	Organic	205-99-2
Benzo(k)fluoranthene	2.18E-06	lb/mmBtu	AP-42 (10/96) Table 3.4-4	4.15E-05	5.19E-06	Particulate	Organic	207-08-9
Benzo(g,h,i)perylene	5.56E-07	lb/mmBtu	AP-42 (10/96) Table 3.4-4	1.06E-05	1.32E-06	Particulate	Organic	205-82-3, 207-08-9
Chrysene	1.53E-06	lb/mmBtu	AP-42 (10/96) Table 3.4-4	2.91E-05	3.64E-06	Particulate	Organic	218-01-9
Dibenz(a,h)anthracene	3.46E-07	lb/mmBtu	AP-42 (10/96) Table 3.4-4	6.59E-06	8.23E-07	Particulate	Organic	53-70-3
Fluoranthene	4.03E-06	lb/mmBtu	AP-42 (10/96) Table 3.4-4	7.67E-05	9.59E-06	Particulate	Organic	206-44-0
Fluorene	1.28E-05	lb/mmBtu	AP-42 (10/96) Table 3.4-4	2.44E-04	3.05E-05	Particulate	Organic	86-73-7
Indeno(1,2,3-cd)pyrene	4.14E-07	lb/mmBtu	AP-42 (10/96) Table 3.4-4	7.88E-06	9.85E-07	Particulate	Organic	193-39-5
Phenanthrene	4.08E-05	lb/mmBtu	AP-42 (10/96) Table 3.4-4	7.77E-04	9.71E-05	Particulate	Organic	85-01-8
Pyrene	3.71E-06	lb/mmBtu	AP-42 (10/96) Table 3.4-4	7.06E-05	8.83E-06	Particulate	Organic	129-00-0
Total PAH	8.35E-05	lb/mmBtu	AP-42 (10/96) Table 3.4-4	1.59E-03	1.99E-04		Organic	
Organic HAPs								
Acetaldehyde	2.52E-05	lb/mmBtu	AP-42 (10/96) Table 3.4-3	4.80E-04	6.00E-05	Vapor	Organic	75-07-0
Acrolein	7.88E-06	lb/mmBtu	AP-42 (10/96) Table 3.4-3	1.50E-04	1.87E-05	Vapor	Organic	107-02-8
Benzene	7.76E-04	lb/mmBtu	AP-42 (10/96) Table 3.4-3	1.48E-02	1.85E-03	Vapor	Organic	71-43-2
Formaldehyde	7.89E-05	lb/mmBtu	AP-42 (10/96) Table 3.4-3	1.50E-03	1.88E-04	Vapor	Organic	50-00-0
Naphthalene	1.30E-04	lb/mmBtu	AP-42 (10/96) Table 3.4-4	2.47E-03	3.09E-04	Particulate	Organic	91-20-3
Propylene	2.79E-03	lb/mmBtu	AP-42 (10/96) Table 3.4-4	5.31E-02	6.64E-03	Particulate	Organic	115-07-1
Toluene	2.81E-04	lb/mmBtu	AP-42 (10/96) Table 3.4-3	5.35E-03	6.69E-04	Vapor	Organic	108-88-3
Xylenes	1.93E-04	lb/mmBtu	AP-42 (10/96) Table 3.4-3	3.67E-03	4.59E-04	Vapor	Organic	1330-20-7
Total Organic HAPs	4.28E-03	lb/mmBtu	AP-42 (10/96) Table 3.4-3	8.15E-02	1.02E-02		Organic	

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SIERRA PACIFIC POWER COMPANY

ELY ENERGY CENTER

PLANT DIESEL ENGINE AUXILIARY GENERATOR EMISSIONS NON-CRITERIA POLLUTANTS

Sulfur Content of Fuel	0.0015%

Description: Emission estimates based on a 750 kW emergency diesel generator using No. 2 fuel oil.
The calculations are based on AP-42 emission factors except as noted.

STACK PARAMETERS:

Stack Flue Gas Temperature	711	K		
Flow Rate	56,871	acfm		
Flow Rate	17,225	scfm		
Exit Velocity	72.20	ft/sec		
Height	19.98	ft		
Stack diameter (top ID)	27.00	inch		
Stack area	3.98	ft2		
Diesel engine output:	4650	hp		
Diesel engine output:	11.84	mmBtu/hr	1hp = 2546 Btu/hr	
Diesel engine input:	138.9	gal/hr	19.0	mmBtu/hr
Maximum Annual Hours of Operation:	250	hours/year		

Notes:
No Inorganic HAPs according to AP-42, Section 3.4
Stack heights, temperatures, velocities, and diameters and fuel usage rates obtained from Caterpillar data sheets.
Diesel engine input value in mmBtu/hr is based on the assumption the heating value of diesel fuel is 19,300 lb/hr with a fuel density of 7.1 lb/gal, using the fuel usage value of 138.9 gal/hr.

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SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
DIESEL FIRE WATER PUMP EMISSIONS NON-CRITERIA POLLUTANTS

Pollutant	Emission Factor	Units	Source	Hourly Emissions (lb/hr)	Annual Emissions (ton/yr)	Pollutant Form	Pollutant Class	Chemical Abstract Services (CAS) Number
PAHs								
Acenaphthene	1.42E-06	lb/mmBtu	AP-42 (10/96) Table 3.3-2	8.17E-07	1.02E-07	Particulate	Organic	83-32-9
Acenaphthylene	5.06E-06	lb/mmBtu	AP-42 (10/96) Table 3.3-2	2.91E-06	3.64E-07	Particulate	Organic	208-96-8
Anthracene	1.87E-06	lb/mmBtu	AP-42 (10/96) Table 3.3-2	1.08E-06	1.35E-07	Particulate	Organic	120-12-7
Benzo(a)anthracene	1.68E-06	lb/mmBtu	AP-42 (10/96) Table 3.3-2	9.67E-07	1.21E-07	Particulate	Organic	56-55-3
Benzo(a)pyrene	1.88E-07	lb/mmBtu	AP-42 (10/96) Table 3.3-2	1.08E-07	1.35E-08	Particulate	Organic	50-32-8
Benzo(b)fluoranthene	9.91E-08	lb/mmBtu	AP-42 (10/96) Table 3.3-2	5.70E-08	7.13E-09	Particulate	Organic	205-99-2
Benzo(k)fluoranthene	1.55E-07	lb/mmBtu	AP-42 (10/96) Table 3.3-2	8.92E-08	1.12E-08	Particulate	Organic	207-08-9
Benzo(g,h,l)perylene	4.89E-07	lb/mmBtu	AP-42 (10/96) Table 3.3-2	2.81E-07	3.52E-08	Particulate	Organic	191-24-2
Chrysene	3.53E-07	lb/mmBtu	AP-42 (10/96) Table 3.3-2	2.03E-07	2.54E-08	Particulate	Organic	218-01-9
Dibenz(a,h)anthracene	5.83E-07	lb/mmBtu	AP-42 (10/96) Table 3.3-2	3.36E-07	4.19E-08	Particulate	Organic	53-70-3
Fluoranthene	7.61E-06	lb/mmBtu	AP-42 (10/96) Table 3.3-2	4.38E-06	5.47E-07	Particulate	Organic	206-44-0
Fluorene	2.92E-05	lb/mmBtu	AP-42 (10/96) Table 3.3-2	1.68E-05	2.10E-06	Particulate	Organic	86-73-7
Indeno(1,2,3-cd)pyrene	3.75E-07	lb/mmBtu	AP-42 (10/96) Table 3.3-2	2.16E-07	2.70E-08	Particulate	Organic	193-39-5
Phenanthrene	2.94E-05	lb/mmBtu	AP-42 (10/96) Table 3.3-2	1.69E-05	2.12E-06	Particulate	Organic	85-01-8
Pyrene	4.78E-06	lb/mmBtu	AP-42 (10/96) Table 3.3-2	2.75E-06	3.44E-07	Particulate	Organic	129-00-0
Total PAH	8.33E-05	lb/mmBtu	AP-42 (10/96) Table 3.3-2	4.79E-05	5.99E-06		Organic	
Organic HAPs								
Acetaldehyde	7.67E-04	lb/mmBtu	AP-42 (10/96) Table 3.3-2	4.41E-04	5.52E-05	Vapor	Organic	75-07-0
Acrolein	9.25E-05	lb/mmBtu	AP-42 (10/96) Table 3.3-2	5.32E-05	6.65E-06	Vapor	Organic	107-02-8
Benzene	9.33E-04	lb/mmBtu	AP-42 (10/96) Table 3.3-2	5.37E-04	6.71E-05	Vapor	Organic	71-43-2
1,3-Butadiene	3.91E-05	lb/mmBtu	AP-42 (10/96) Table 3.3-2	2.25E-05	2.81E-06	Vapor	Organic	106-99-0
Formaldehyde	1.18E-03	lb/mmBtu	AP-42 (10/96) Table 3.3-2	6.79E-04	8.49E-05	Vapor	Organic	50-00-0
Naphthalene	8.48E-05	lb/mmBtu	AP-42 (10/96) Table 3.3-2	4.88E-05	6.10E-06	Particulate	Organic	91-20-3
Propylene	2.58E-03	lb/mmBtu	AP-42 (10/96) Table 3.3-2	1.48E-03	1.86E-04	Particulate	Organic	115-07-1
Toluene	4.09E-04	lb/mmBtu	AP-42 (10/96) Table 3.3-2	2.35E-04	2.94E-05	Vapor	Organic	108-88-3
Xylenes	2.85E-04	lb/mmBtu	AP-42 (10/96) Table 3.3-2	1.64E-04	2.05E-05	Vapor	Organic	1330-20-7
Total Organic HAPs	6.37E-03	lb/mmBtu	AP-42 (10/96) Table 3.3-2	3.67E-03	4.58E-04		Organic	

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SIERRA PACIFIC POWER COMPANY

ELY ENERGY CENTER

DIESEL FIRE WATER PUMP EMISSIONS NON-CRITERIA POLLUTANTS

Sulfur Content of Fuel	0.0015%

Description: Emission estimates are for a 787.5 HP diesel driven fire pump.
Calculations are based on AP-42 emission factors.

STACK PARAMETER

Stack Flue Gas Temperature	836	K		
Flow Rate	15,970	acfm		
Flow Rate	4,111	scfm		
Exit Velocity	87	ft/sec		
Height	10	ft		
Stack diameter (top ID)	12	inch		
Stack area	1	ft2		
Diesel engine output:	788	HP	1hp=2546 Btu/hr	
Diesel engine output:	2.00	mmBtu/hr		
Diesel engine input:	4.2	gal/hr	0.6	mmBtu/hr
Maximum Annual Hours of Operation:	250	hours/year		

Notes:
No Inorganic HAPs according to AP-42, Section 3.3
Diesel engine input value in mmBtu/hr is based on the assumption the heating value of diesel fuel is 19,300 lb/hr with a fuel density of 7.1 lb/gal, using the fuel usage value of 4.2 gal/hr.

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SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
DIESEL BOOSTER FIRE PUMP EMISSIONS NON-CRITERIA POLLUTANTS

Pollutant	Emission Factor	Units	Source	Hourly Emissions (lb/hr)	Annual Emissions (ton/yr)	Pollutant Form	Pollutant Class	Chemical Abstract Services (CAS) Number
PAHs								
Acenaphthene	1.42E-06	lb/mmBtu	AP-42 (10/96) Table 3.3-2	8.17E-07	1.02E-07	Particulate	Organic	83-32-9
Acenaphthylene	5.06E-06	lb/mmBtu	AP-42 (10/96) Table 3.3-2	2.91E-06	3.64E-07	Particulate	Organic	208-96-8
Anthracene	1.87E-06	lb/mmBtu	AP-42 (10/96) Table 3.3-2	1.08E-06	1.35E-07	Particulate	Organic	120-12-7
Benzo(a)anthracene	1.68E-06	lb/mmBtu	AP-42 (10/96) Table 3.3-2	9.67E-07	1.21E-07	Particulate	Organic	56-55-3
Benzo(a)pyrene	1.88E-07	lb/mmBtu	AP-42 (10/96) Table 3.3-2	1.08E-07	1.35E-08	Particulate	Organic	50-32-8
Benzo(b)fluoranthene	9.91E-08	lb/mmBtu	AP-42 (10/96) Table 3.3-2	5.70E-08	7.13E-09	Particulate	Organic	205-99-2
Benzo(k)fluoranthene	1.55E-07	lb/mmBtu	AP-42 (10/96) Table 3.3-2	8.92E-08	1.12E-08	Particulate	Organic	207-08-9
Benzo(g,h,l)perylene	4.89E-07	lb/mmBtu	AP-42 (10/96) Table 3.3-2	2.81E-07	3.52E-08	Particulate	Organic	191-24-2
Chrysene	3.53E-07	lb/mmBtu	AP-42 (10/96) Table 3.3-2	2.03E-07	2.54E-08	Particulate	Organic	218-01-9
Dibenz(a,h)anthracene	5.83E-07	lb/mmBtu	AP-42 (10/96) Table 3.3-2	3.36E-07	4.19E-08	Particulate	Organic	53-70-3
Fluoranthene	7.61E-06	lb/mmBtu	AP-42 (10/96) Table 3.3-2	4.38E-06	5.47E-07	Particulate	Organic	206-44-0
Fluorene	2.92E-05	lb/mmBtu	AP-42 (10/96) Table 3.3-2	1.68E-05	2.10E-06	Particulate	Organic	86-73-7
Indeno(1,2,3-cd)pyrene	3.75E-07	lb/mmBtu	AP-42 (10/96) Table 3.3-2	2.16E-07	2.70E-08	Particulate	Organic	193-39-5
Phenanthrene	2.94E-05	lb/mmBtu	AP-42 (10/96) Table 3.3-2	1.69E-05	2.12E-06	Particulate	Organic	85-01-8
Pyrene	4.78E-06	lb/mmBtu	AP-42 (10/96) Table 3.3-2	2.75E-06	3.44E-07	Particulate	Organic	129-00-0
Total PAH	8.33E-05	lb/mmBtu	AP-42 (10/96) Table 3.3-2	4.79E-05	5.99E-06		Organic	
Organic HAPs								
Acetaldehyde	7.67E-04	lb/mmBtu	AP-42 (10/96) Table 3.3-2	4.41E-04	5.52E-05	Vapor	Organic	75-07-0
Acrolein	9.25E-05	lb/mmBtu	AP-42 (10/96) Table 3.3-2	5.32E-05	6.65E-06	Vapor	Organic	107-02-8
Benzene	9.33E-04	lb/mmBtu	AP-42 (10/96) Table 3.3-2	5.37E-04	6.71E-05	Vapor	Organic	71-43-2
1,3-Butadiene	3.91E-05	lb/mmBtu	AP-42 (10/96) Table 3.3-2	2.25E-05	2.81E-06	Vapor	Organic	106-99-0
Formaldehyde	1.18E-03	lb/mmBtu	AP-42 (10/96) Table 3.3-2	6.79E-04	8.49E-05	Vapor	Organic	50-00-0
Naphthalene	8.48E-05	lb/mmBtu	AP-42 (10/96) Table 3.3-2	4.88E-05	6.10E-06	Particulate	Organic	91-20-3
Propylene	2.58E-03	lb/mmBtu	AP-42 (10/96) Table 3.3-2	1.48E-03	1.86E-04	Particulate	Organic	115-07-1
Toluene	4.09E-04	lb/mmBtu	AP-42 (10/96) Table 3.3-2	2.35E-04	2.94E-05	Vapor	Organic	108-88-3
Xylenes	2.85E-04	lb/mmBtu	AP-42 (10/96) Table 3.3-2	1.64E-04	2.05E-05	Vapor	Organic	1330-20-7
Total Organic HAPs	6.37E-03	lb/mmBtu	AP-42 (10/96) Table 3.3-2	3.67E-03	4.58E-04		Organic	

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SIERRA PACIFIC POWER COMPANY

ELY ENERGY CENTER

DIESEL BOOSTER FIRE PUMP EMISSIONS NON-CRITERIA POLLUTANTS

Sulfur Content of Fuel	0.0015%

Description: Emission estimates are for a 90 HP diesel driven fire pump.
Calculations are based on AP-42 emission factors.

STACK PARAMETERS:

Stack Flue Gas Temperature	308	K		
Flow Rate	518	acfm		
Flow Rate	362	scfm		
Exit Velocity	17.28	ft/sec		
Height	10.00	ft		
Stack diameter (top ID)	8.00	inch		
Stack area	0.35	ft2		
Diesel engine output:	90	HP	1hp=2546 Btu/hr	
Diesel engine output:	0.23	mmBtu/hr		
Diesel engine input:	4.2	gal/hr	0.6	mmBtu/hr
Maximum Annual Hours of Operation:	250	hours/year		

Notes:
No Inorganic HAPs according to AP-42, Section 3.3
Diesel engine input value in mmBtu/hr is based on the assumption the heating value of diesel fuel is 19,300 lb/hr with a fuel density of 7.1 lb/gal, using the fuel usage value of 4.2 gal/hr.

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SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
PLANT DIESEL LOCOMOTIVE ENGINE EMISSIONS NON-CRITERIA POLLUTANTS

				Per Engine[1]		Per 6 Engines[1]				
Pollutant	**Emission Factor**	**Units**	**Source**	**Hourly Emissions (lb/hr)**	**Annual Emissions (ton/yr)**	**Hourly Emissions (lb/hr)**	**Annual Emissions (ton/yr)**	**Pollutant Form**	**Pollutant Class**	**Chemical Abstract Services (CAS) Number**
PAHs										
Acenaphthene	4.68E-06	lb/mmBtu	AP-42 (10/96) Table 3.4-4	2.23E-05	9.77E-05	1.34E-04	5.86E-04	Particulate	Organic	83-32-9
Acenaphthylene	9.23E-06	lb/mmBtu	AP-42 (10/96) Table 3.4-4	4.40E-05	1.93E-04	2.64E-04	1.16E-03	Particulate	Organic	208-96-8
Anthracene	1.23E-06	lb/mmBtu	AP-42 (10/96) Table 3.4-4	5.87E-06	2.57E-05	3.52E-05	1.54E-04	Particulate	Organic	120-12-7
Benzo(a)anthracene	6.22E-07	lb/mmBtu	AP-42 (10/96) Table 3.4-4	2.97E-06	1.30E-05	1.78E-05	7.79E-05	Particulate	Organic	56-55-3
Benzo(a)pyrene	2.57E-07	lb/mmBtu	AP-42 (10/96) Table 3.4-4	1.23E-06	5.37E-06	7.35E-06	3.22E-05	Particulate	Organic	50-32-8
Benzo(b)fluoranthene	1.11E-06	lb/mmBtu	AP-42 (10/96) Table 3.4-4	5.29E-06	2.32E-05	3.18E-05	1.39E-04	Particulate	Organic	205-99-2
Benzo(k)fluoranthene	2.18E-06	lb/mmBtu	AP-42 (10/96) Table 3.4-4	1.04E-05	4.55E-05	6.24E-05	2.73E-04	Particulate	Organic	207-08-9
Benzo(g,h,i)perylene	5.56E-07	lb/mmBtu	AP-42 (10/96) Table 3.4-4	2.65E-06	1.16E-05	1.59E-05	6.97E-05	Particulate	Organic	191-24-2, 205-82-3, 207-08-9
Chrysene	1.53E-06	lb/mmBtu	AP-42 (10/96) Table 3.4-4	7.30E-06	3.20E-05	4.38E-05	1.92E-04	Particulate	Organic	218-01-9
Dibenz(a,h)anthracene	3.46E-07	lb/mmBtu	AP-42 (10/96) Table 3.4-4	1.65E-06	7.23E-06	9.90E-06	4.34E-05	Particulate	Organic	53-70-3
Fluoranthene	4.03E-06	lb/mmBtu	AP-42 (10/96) Table 3.4-4	1.92E-05	8.42E-05	1.15E-04	5.05E-04	Particulate	Organic	206-44-0
Fluorene	1.28E-05	lb/mmBtu	AP-42 (10/96) Table 3.4-4	6.10E-05	2.67E-04	3.66E-04	1.60E-03	Particulate	Organic	86-73-7
Indeno(1,2,3-cd)pyrene	4.14E-07	lb/mmBtu	AP-42 (10/96) Table 3.4-4	1.97E-06	8.65E-06	1.18E-05	5.19E-05	Particulate	Organic	193-39-5
Phenanthrene	4.08E-05	lb/mmBtu	AP-42 (10/96) Table 3.4-4	1.95E-04	8.52E-04	1.17E-03	5.11E-03	Particulate	Organic	85-01-8
Pyrene	3.71E-06	lb/mmBtu	AP-42 (10/96) Table 3.4-4	1.77E-05	7.75E-05	1.06E-04	4.65E-04	Particulate	Organic	129-00-0
Total PAH	8.35E-05	lb/mmBtu	AP-42 (10/96) Table 3.4-4	3.98E-04	1.74E-03	2.39E-03	1.05E-02		Organic	
Organic HAPs										
Acetaldehyde	2.52E-05	lb/mmBtu	AP-42 (10/96) Table 3.4-3	1.20E-04	5.26E-04	7.21E-04	3.16E-03	Vapor	Organic	75-07-0
Acrolein	7.88E-06	lb/mmBtu	AP-42 (10/96) Table 3.4-3	3.76E-05	1.65E-04	2.25E-04	9.88E-04	Vapor	Organic	107-02-8
Benzene	7.76E-04	lb/mmBtu	AP-42 (10/96) Table 3.4-3	3.70E-03	1.62E-02	2.22E-02	9.72E-02	Vapor	Organic	71-43-2
Formaldehyde	7.89E-05	lb/mmBtu	AP-42 (10/96) Table 3.4-3	3.76E-04	1.65E-03	2.26E-03	9.89E-03	Vapor	Organic	50-00-0
Naphthalene	1.30E-04	lb/mmBtu	AP-42 (10/96) Table 3.4-4	6.20E-04	2.72E-03	3.72E-03	1.63E-02	Particulate	Organic	91-20-3
Propylene	2.79E-03	lb/mmBtu	AP-42 (10/96) Table 3.4-4	1.33E-02	5.83E-02	7.98E-02	3.50E-01	Particulate	Organic	115-07-1
Toluene	2.81E-04	lb/mmBtu	AP-42 (10/96) Table 3.4-3	1.34E-03	5.87E-03	8.04E-03	3.52E-02	Vapor	Organic	108-88-3
Xylenes	1.93E-04	lb/mmBtu	AP-42 (10/96) Table 3.4-3	9.20E-04	4.03E-03	5.52E-03	2.42E-02	Vapor	Organic	1330-20-7
Total Organic HAPs	4.28E-03	lb/mmBtu	AP-42 (10/96) Table 3.4-3	2.04E-02	8.94E-02	1.23E-01	5.37E-01		Organic	

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SIERRA PACIFIC POWER COMPANY

ELY ENERGY CENTER

PLANT DIESEL LOCOMOTIVE ENGINE EMISSIONS NON-CRITERIA POLLUTANTS

Sulfur Content of Fuel	0.0015%

Description: Emission estimates based on a idle diesel locomotive engines using No. 2 fuel oil. The calculations are based on AP-42 emission factors except as noted.

STACK PARAMETERS:

Stack Flue Gas Temperature	800	°F	700	K
Flow Rate	28,611	acfm		
Flow Rate	8,801	scfm		
Exit Velocity	83.01	ft/sec		
Height	19.98	ft		
Stack diameter (top ID)	18.00	inch		
Stack area	1.77	ft2		
Diesel engine idle output:	400	hp		
Diesel engine idle output:	1.02	mmBtu/hr	1hp = 2546 Btu/hr	
Diesel engine input:	34.8	gal/hr	4.8	mmBtu/hr
Maximum Annual Hours of Operation:	8760	hours/year		

Notes:

[1] It is assumed that 6 locomotive engines will be present on-site at one time, 3 in the front of the train, and 3 at the back.

[2]source: USEPA Final Emission Standards for Locomotives - Tier 1 Line-Haul Duty Cycle Exhaust Emission Standards (EPA 420-F-97-048)
Diesel engine input value in mmBtu/hr is based on the assumption the heating value of diesel fuel is 19,300 lb/hr with a fuel density of 7.1 lb/gal, using the fuel usage value of 34.8 gal/hr.

A6-74
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
SWITCHYARD DIESEL ENGINE AUXILIARY GENERATOR EMISSIONS NON-CRITERIA POLLUTANTS

Pollutant	Emission Factor	Units	Source	Hourly Emissions (lb/hr)	Annual Emissions (ton/yr)	Pollutant Form	Pollutant Class	Chemical Abstract Services (CAS) Number
PAHs								
Acenaphthene	4.68E-06	lb/mmBtu	AP-42 (10/96) Table 3.4-4	2.40E-05	3.00E-06	Particulate	Organic	83-32-9
Acenaphthylene	9.23E-06	lb/mmBtu	AP-42 (10/96) Table 3.4-4	4.73E-05	5.91E-06	Particulate	Organic	208-96-8
Anthracene	1.23E-06	lb/mmBtu	AP-42 (10/96) Table 3.4-4	6.30E-06	7.88E-07	Particulate	Organic	120-12-7
Benzo(a)anthracene	6.22E-07	lb/mmBtu	AP-42 (10/96) Table 3.4-4	3.19E-06	3.98E-07	Particulate	Organic	56-55-3
Benzo(a)pyrene	2.57E-07	lb/mmBtu	AP-42 (10/96) Table 3.4-4	1.32E-06	1.65E-07	Particulate	Organic	50-32-8
Benzo(b)fluoranthene	1.11E-06	lb/mmBtu	AP-42 (10/96) Table 3.4-4	5.69E-06	7.11E-07	Particulate	Organic	205-99-2
Benzo(k)fluoranthene	2.18E-06	lb/mmBtu	AP-42 (10/96) Table 3.4-4	1.12E-05	1.40E-06	Particulate	Organic	207-08-9
Benzo(g,h,i)perylene	5.56E-07	lb/mmBtu	AP-42 (10/96) Table 3.4-4	2.85E-06	3.56E-07	Particulate	Organic	205-82-3, 207-08-9
Chrysene	1.53E-06	lb/mmBtu	AP-42 (10/96) Table 3.4-4	7.84E-06	9.80E-07	Particulate	Organic	218-01-9
Dibenz(a,h)anthracene	3.46E-07	lb/mmBtu	AP-42 (10/96) Table 3.4-4	1.77E-06	2.22E-07	Particulate	Organic	53-70-3
Fluoranthene	4.03E-06	lb/mmBtu	AP-42 (10/96) Table 3.4-4	2.07E-05	2.58E-06	Particulate	Organic	206-44-0
Fluorene	1.28E-05	lb/mmBtu	AP-42 (10/96) Table 3.4-4	6.56E-05	8.20E-06	Particulate	Organic	86-73-7
Indeno(1,2,3-cd)pyrene	4.14E-07	lb/mmBtu	AP-42 (10/96) Table 3.4-4	2.12E-06	2.65E-07	Particulate	Organic	193-39-5
Phenanthrene	4.08E-05	lb/mmBtu	AP-42 (10/96) Table 3.4-4	2.09E-04	2.61E-05	Particulate	Organic	85-01-8
Pyrene	3.71E-06	lb/mmBtu	AP-42 (10/96) Table 3.4-4	1.90E-05	2.38E-06	Particulate	Organic	129-00-0
Total PAH	8.35E-05	lb/mmBtu	AP-42 (10/96) Table 3.4-4	4.28E-04	5.35E-05		Organic	
Organic HAPs								
Acetaldehyde	2.52E-05	lb/mmBtu	AP-42 (10/96) Table 3.4-3	1.29E-04	1.61E-05	Vapor	Organic	75-07-0
Acrolein	7.88E-06	lb/mmBtu	AP-42 (10/96) Table 3.4-3	4.04E-05	5.05E-06	Vapor	Organic	107-02-8
Benzene	7.76E-04	lb/mmBtu	AP-42 (10/96) Table 3.4-3	3.98E-03	4.97E-04	Vapor	Organic	71-43-2
Formaldehyde	7.89E-05	lb/mmBtu	AP-42 (10/96) Table 3.4-3	4.04E-04	5.05E-05	Vapor	Organic	50-00-0
Naphthalene	1.30E-04	lb/mmBtu	AP-42 (10/96) Table 3.4-4	6.66E-04	8.33E-05	Particulate	Organic	91-20-3
Propylene	2.79E-03	lb/mmBtu	AP-42 (10/96) Table 3.4-4	1.43E-02	1.79E-03	Particulate	Organic	115-07-1
Toluene	2.81E-04	lb/mmBtu	AP-42 (10/96) Table 3.4-3	1.44E-03	1.80E-04	Vapor	Organic	108-88-3
Xylenes	1.93E-04	lb/mmBtu	AP-42 (10/96) Table 3.4-3	9.89E-04	1.24E-04	Vapor	Organic	1330-20-7
Total Organic HAPs	4.28E-03	lb/mmBtu	AP-42 (10/96) Table 3.4-3	2.19E-02	2.74E-03		Organic	

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SIERRA PACIFIC POWER COMPANY

ELY ENERGY CENTER

SWITCHYARD DIESEL ENGINE AUXILIARY GENERATOR EMISSIONS NON-CRITERIA POLLUTANTS

Sulfur Content of Fuel	0.0015%

Description: Emission estimates based on a 750 kW emergency diesel generator using No. 2 fuel oil. The calculations are based on AP-42 emission factors except as noted.

STACK PARAMETERS:

Stack Flue Gas Temperature	805	K		
Flow Rate	17,901	acfm		
Flow Rate	4,786	scfm		
Exit Velocity	74.62	ft/sec		
Height	19.98	ft		
Stack diameter (top ID)	14.00	inch		
Stack area	1.07	ft2		
Diesel engine output:	1013	hp		
Diesel engine output:	2.58	mmBtu/hr	1hp = 2546 Btu/hr	
Diesel engine input:	37.4	gal/hr	5.1	mmBtu/hr
Maximum Annual Hours of Operation:	250	hours/year		

Notes:
No Inorganic HAPs according to AP-42, Section 3.4
Stack heights, temperatures, velocities, and diameters and fuel usage rates obtained from Caterpillar data sheets.
Diesel engine input value in mmBtu/hr is based on the assumption the heating value of diesel fuel is 19,300 lb/hr with a fuel density of 7.1 lb/gal, using the fuel usage value of 37.4 gal/hr.

A6-75
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
DIESEL SO2 ABSORBER EMERGENCY QUENCH PUMP EMISSIONS NON-CRITERIA POLLUTANTS

Pollutant	Emission Factor	Units	Source	Hourly Emissions (lb/hr)	Annual Emissions (ton/yr)	Pollutant Form	Pollutant Class	Chemical Abstract Services (CAS) Number
PAHs								
Acenaphthene	1.42E-06	lb/mmBtu	AP-42 (10/96) Table 3.3-2	5.66E-06	7.08E-07	Particulate	Organic	83-32-9
Acenaphthylene	5.06E-06	lb/mmBtu	AP-42 (10/96) Table 3.3-2	2.02E-05	2.52E-06	Particulate	Organic	208-96-8
Anthracene	1.87E-06	lb/mmBtu	AP-42 (10/96) Table 3.3-2	7.46E-06	9.32E-07	Particulate	Organic	120-12-7
Benzo(a)anthracene	1.68E-06	lb/mmBtu	AP-42 (10/96) Table 3.3-2	6.70E-06	8.37E-07	Particulate	Organic	56-55-3
Benzo(a)pyrene	1.88E-07	lb/mmBtu	AP-42 (10/96) Table 3.3-2	7.50E-07	9.37E-08	Particulate	Organic	50-32-8
Benzo(b)fluoranthene	9.91E-08	lb/mmBtu	AP-42 (10/96) Table 3.3-2	3.95E-07	4.94E-08	Particulate	Organic	205-99-2
Benzo(k)fluoranthene	1.55E-07	lb/mmBtu	AP-42 (10/96) Table 3.3-2	6.18E-07	7.73E-08	Particulate	Organic	207-08-9
Benzo(g,h,l)perylene	4.89E-07	lb/mmBtu	AP-42 (10/96) Table 3.3-2	1.95E-06	2.44E-07	Particulate	Organic	191-24-2
Chrysene	3.53E-07	lb/mmBtu	AP-42 (10/96) Table 3.3-2	1.41E-06	1.76E-07	Particulate	Organic	218-01-9
Dibenz(a,h)anthracene	5.83E-07	lb/mmBtu	AP-42 (10/96) Table 3.3-2	2.32E-06	2.91E-07	Particulate	Organic	53-70-3
Fluoranthene	7.61E-06	lb/mmBtu	AP-42 (10/96) Table 3.3-2	3.03E-05	3.79E-06	Particulate	Organic	206-44-0
Fluorene	2.92E-05	lb/mmBtu	AP-42 (10/96) Table 3.3-2	1.16E-04	1.46E-05	Particulate	Organic	86-73-7
Indeno(1,2,3-cd)pyrene	3.75E-07	lb/mmBtu	AP-42 (10/96) Table 3.3-2	1.50E-06	1.87E-07	Particulate	Organic	193-39-5
Phenanthrene	2.94E-05	lb/mmBtu	AP-42 (10/96) Table 3.3-2	1.17E-04	1.47E-05	Particulate	Organic	85-01-8
Pyrene	4.78E-06	lb/mmBtu	AP-42 (10/96) Table 3.3-2	1.91E-05	2.38E-06	Particulate	Organic	129-00-0
Total PAH	8.33E-05	lb/mmBtu	AP-42 (10/96) Table 3.3-2	3.32E-04	4.15E-05		Organic	
Organic HAPs								
Acetaldehyde	7.67E-04	lb/mmBtu	AP-42 (10/96) Table 3.3-2	3.06E-03	3.82E-04	Vapor	Organic	75-07-0
Acrolein	9.25E-05	lb/mmBtu	AP-42 (10/96) Table 3.3-2	3.69E-04	4.61E-05	Vapor	Organic	107-02-8
Benzene	9.33E-04	lb/mmBtu	AP-42 (10/96) Table 3.3-2	3.72E-03	4.65E-04	Vapor	Organic	71-43-2
1,3-Butadiene	3.91E-05	lb/mmBtu	AP-42 (10/96) Table 3.3-2	1.56E-04	1.95E-05	Vapor	Organic	106-99-0
Formaldehyde	1.18E-03	lb/mmBtu	AP-42 (10/96) Table 3.3-2	4.71E-03	5.88E-04	Vapor	Organic	50-00-0
Naphthalene	8.48E-05	lb/mmBtu	AP-42 (10/96) Table 3.3-2	3.38E-04	4.23E-05	Particulate	Organic	91-20-3
Propylene	2.58E-03	lb/mmBtu	AP-42 (10/96) Table 3.3-2	1.03E-02	1.29E-03	Particulate	Organic	115-07-1
Toluene	4.09E-04	lb/mmBtu	AP-42 (10/96) Table 3.3-2	1.63E-03	2.04E-04	Vapor	Organic	108-88-3
Xylenes	2.85E-04	lb/mmBtu	AP-42 (10/96) Table 3.3-2	1.14E-03	1.42E-04	Vapor	Organic	1330-20-7
Total Organic HAPs	6.37E-03	lb/mmBtu	AP-42 (10/96) Table 3.3-2	2.54E-02	3.18E-03		Organic	

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SIERRA PACIFIC POWER COMPANY

ELY ENERGY CENTER

DIESEL SO2 ABSORBER EMERGENCY QUENCH PUMP EMISSIONS NON-CRITERIA POLLUTANTS

Sulfur Content of Fuel	0.0015%

Description: Emission estimates are for a 682.5 HP diesel driven fire pump.
Calculations are based on AP-42 emission factors.

STACK PARAMETERS:

Stack Flue Gas Temperature	811	K		
Flow Rate	11,675	acfm		
Flow Rate	3,100	scfm		
Exit Velocity	65.78	ft/sec		
Height	10.00	ft		
Stack diameter (top ID)	12.00	inch		
Stack area	0.79	ft2		
Diesel engine output:	683	HP	1hp=2546 Btu/hr	
Diesel engine output:	1.74	mmBtu/hr		
Diesel engine input:	29.1	gal/hr	4.0	mmBtu/hr
Maximum Annual Hours of Operation:	250	hours/year		

Notes:
No Inorganic HAPs according to AP-42, Section 3.3
Diesel engine input value in mmBtu/hr is based on the assumption the heating value of diesel fuel is 19,300 lb/hr with a fuel density of 7.1 lb/gal, using the fuel usage value of 29.1 gal/hr.

A6-76
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
COAL HANDLING - TOXIC MATERIAL HANDLING EMISSIONS

FIN #	Emissions Source Description	Coal[2] PM_{10} lb/ hour	PM_{10} tons/ year	Antimony[1] 0.49 ppm lb/ hour	Antimony tons/ year	Arsenic[1] 2.6 ppm lb/ hour	Arsenic tons/ year	Beryllium[1] 0.54 ppm lb/ hour	Beryllium tons/ year	Cadmium[1] 0.21 ppm lb/ hour	Cadmium tons/ year	Chromium[1] 6.1 ppm lb/ hour	Chromium tons/ year	Pollutant Form
New Coal Handling System:														
MDC-1	Car Dumper Dust Collector	**6.86**	**30.0**	3.4E-06	1.5E-05	1.8E-05	7.8E-05	3.7E-06	1.6E-05	1.4E-06	6.3E-06	4.2E-05	1.8E-04	Particulate
MDC-2	Transfer Tower #1 Dust Collector	**0.90**	**3.9**	4.4E-07	1.9E-06	2.3E-06	1.0E-05	4.9E-07	2.1E-06	1.9E-07	8.3E-07	5.5E-06	2.4E-05	Particulate
MDC-3	Transfer Tower #2 Dust Collector	**0.90**	**3.9**	4.4E-07	1.9E-06	2.3E-06	1.0E-05	4.9E-07	2.1E-06	1.9E-07	8.3E-07	5.5E-06	2.4E-05	Particulate
MDC-4	Crusher Building Dust Collector	**0.99**	**4.3**	4.8E-07	2.1E-06	2.6E-06	1.1E-05	5.3E-07	2.3E-06	2.1E-07	9.1E-07	6.0E-06	2.6E-05	Particulate
MDC-5	Transfer Tower #3 Dust Collector	**0.90**	**3.9**	4.4E-07	1.9E-06	2.3E-06	1.0E-05	4.9E-07	2.1E-06	1.9E-07	8.3E-07	5.5E-06	2.4E-05	Particulate
CDC-1	Coal Storage Dome #1 Dust Collector (live storage)	**6.43**	**28.2**	3.2E-06	1.4E-05	1.7E-05	7.3E-05	3.5E-06	1.5E-05	1.4E-06	5.9E-06	3.9E-05	1.7E-04	Particulate
CDC-2	Coal Storage Dome #2 Dust Collector (live storage)	**6.43**	**28.2**	3.2E-06	1.4E-05	1.7E-05	7.3E-05	3.5E-06	1.5E-05	1.4E-06	5.9E-06	3.9E-05	1.7E-04	Particulate
CDC-3	Coal Reclaim Hopper #1 Dust Collector	**0.47**	**2.1**	2.3E-07	1.0E-06	1.2E-06	5.4E-06	2.5E-07	1.1E-06	9.9E-08	4.3E-07	2.9E-06	1.3E-05	Particulate
CDC-4	Coal Reclaim Hopper #2 Dust Collector	**0.47**	**2.1**	2.3E-07	1.0E-06	1.2E-06	5.4E-06	2.5E-07	1.1E-06	9.9E-08	4.3E-07	2.9E-06	1.3E-05	Particulate
CDC-5	Coal Tripper Floor Unit #1 Dust Collector A	**0.99**	**4.3**	4.8E-07	2.1E-06	2.6E-06	1.1E-05	5.3E-07	2.3E-06	2.1E-07	9.1E-07	6.0E-06	2.6E-05	Particulate
CDC-6	Coal Tripper Floor Unit #1 Dust Collector B	**0.99**	**4.3**	4.8E-07	2.1E-06	2.6E-06	1.1E-05	5.3E-07	2.3E-06	2.1E-07	9.1E-07	6.0E-06	2.6E-05	Particulate
CH-1	Coal Unloading Belt Feeder Transfer Point	**0.0000**	**0.0000**	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	Particulate
CH-2	Coal Stockout Conveyor	**0.07**	**0.3**	3.4E-08	1.5E-07	1.8E-07	8.0E-07	3.8E-08	1.7E-07	1.5E-08	6.5E-08	4.3E-07	1.9E-06	Particulate
CH-3	Active Coal Pile Wind Erosion and Maintenance	**1.94**	**8.5**	9.5E-07	4.2E-06	5.1E-06	2.2E-05	1.0E-06	4.6E-06	4.1E-07	1.8E-06	1.2E-05	5.2E-05	Particulate
CH-4	Inactive Portion of Coal Pile Wind Erosion	**0.03**	**0.1**	1.3E-08	5.6E-08	6.7E-08	3.0E-07	1.4E-08	6.1E-08	5.5E-09	2.4E-08	1.6E-07	6.9E-07	Particulate
Total from Coal Handling				**1.4E-05**	**6.1E-05**	**7.4E-05**	**3.2E-04**	**1.5E-05**	**6.7E-05**	**6.0E-06**	**2.6E-05**	**1.7E-04**	**7.6E-04**	

A6-76
SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
COAL HANDLING - TOXIC MATERIAL HANDLING EMISSIONS

FIN #	Emissions Source Description / Coal[2]	PM_{10}		Cobalt[1] 1.9 ppm		Chlorine[1] 118.3 ppm		Fluorine 43.7 ppm		Lead[1] 3 ppm		Manganese[1] 26 ppm		Pollutant Form
		lb/ hour	tons/ year	lb/ hour	tons/ year	lb/ hour	tons/ year	lb/ hour	tons/ year	lb/ hour	tons/ year	lb/ hour	tons/ year	
New Coal Handling System:														
MDC-1	Car Dumper Dust Collector	**6.86**	**30.0**	1.3E-05	5.7E-05	8.1E-04	3.6E-03	3.0E-04	1.3E-03	2.1E-05	9.0E-05	1.8E-04	7.8E-04	Particulate
MDC-2	Transfer Tower #1 Dust Collector	**0.90**	**3.9**	1.7E-06	7.5E-06	1.1E-04	4.7E-04	3.9E-05	1.7E-04	2.7E-06	1.2E-05	2.3E-05	1.0E-04	Particulate
MDC-3	Transfer Tower #2 Dust Collector	**0.90**	**3.9**	1.7E-06	7.5E-06	1.1E-04	4.7E-04	3.9E-05	1.7E-04	2.7E-06	1.2E-05	2.3E-05	1.0E-04	Particulate
MDC-4	Crusher Building Dust Collector	**0.99**	**4.3**	1.9E-06	8.2E-06	1.2E-04	5.1E-04	4.3E-05	1.9E-04	3.0E-06	1.3E-05	2.6E-05	1.1E-04	Particulate
MDC-5	Transfer Tower #3 Dust Collector	**0.90**	**3.9**	1.7E-06	7.5E-06	1.1E-04	4.7E-04	3.9E-05	1.7E-04	2.7E-06	1.2E-05	2.3E-05	1.0E-04	Particulate
CDC-1	Coal Storage Dome #1 Dust Collector (live storage)	**6.43**	**28.2**	1.2E-05	5.3E-05	7.6E-04	3.3E-03	2.8E-04	1.2E-03	1.9E-05	8.4E-05	1.7E-04	7.3E-04	Particulate
CDC-2	Coal Storage Dome #2 Dust Collector (live storage)	**6.43**	**28.2**	1.2E-05	5.3E-05	7.6E-04	3.3E-03	2.8E-04	1.2E-03	1.9E-05	8.4E-05	1.7E-04	7.3E-04	Particulate
CDC-3	Coal Reclaim Hopper #1 Dust Collector	**0.47**	**2.1**	9.0E-07	3.9E-06	5.6E-05	2.4E-04	2.1E-05	9.0E-05	1.4E-06	6.2E-06	1.2E-05	5.4E-05	Particulate
CDC-4	Coal Reclaim Hopper #2 Dust Collector	**0.47**	**2.1**	9.0E-07	3.9E-06	5.6E-05	2.4E-04	2.1E-05	9.0E-05	1.4E-06	6.2E-06	1.2E-05	5.4E-05	Particulate
CDC-5	Coal Tripper Floor Unit #1 Dust Collector A	**0.99**	**4.3**	1.9E-06	8.2E-06	1.2E-04	5.1E-04	4.3E-05	1.9E-04	3.0E-06	1.3E-05	2.6E-05	1.1E-04	Particulate
CDC-6	Coal Tripper Floor Unit #1 Dust Collector B	**0.99**	**4.3**	1.9E-06	8.2E-06	1.2E-04	5.1E-04	4.3E-05	1.9E-04	3.0E-06	1.3E-05	2.6E-05	1.1E-04	Particulate
CH-1	Coal Unloading Belt Feeder Transfer Point	**0.0000**	**0.0000**	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	Particulate
CH-2	Coal Stockout Conveyor	**0.07**	**0.3**	1.3E-07	5.8E-07	8.3E-06	3.6E-05	3.1E-06	1.3E-05	2.1E-07	9.2E-07	1.8E-06	8.0E-06	Particulate
CH-3	Active Coal Pile Wind Erosion and Maintenance	**1.94**	**8.5**	3.7E-06	1.6E-05	2.3E-04	1.0E-03	8.5E-05	3.7E-04	5.8E-06	2.6E-05	5.1E-05	2.2E-04	Particulate
CH-4	Inactive Portion of Coal Pile Wind Erosion	**0.03**	**0.1**	4.9E-08	2.2E-07	3.1E-06	1.3E-05	1.1E-06	5.0E-06	7.8E-08	3.4E-07	6.7E-07	3.0E-06	Particulate
Total from Coal Handling				**5.4E-05**	**2.4E-04**	**3.4E-03**	**1.5E-02**	**1.2E-03**	**5.4E-03**	**8.5E-05**	**3.7E-04**	**7.4E-04**	**3.2E-03**	

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SIERRA PACIFIC POWER COMPANY
ELY ENERGY CENTER
COAL HANDLING - TOXIC MATERIAL HANDLING EMISSIONS

FIN #	Emissions Source Description	Coal[2] PM_{10} lb/ hour	PM_{10} tons/ year	Mercury[1] 0.130 ppm lb/ hour	Mercury[1] 0.130 ppm tons/ year	Nickel[1] 4.6 ppm lb/ hour	Nickel[1] 4.6 ppm tons/ year	Selenium[1] 1.10 ppm lb/ hour	Selenium[1] 1.10 ppm tons/ year	Uranium 1.30 ppm lb/ hour	Uranium 1.30 ppm tons/ year	Pollutant Form
New Coal Handling System:												
MDC-1	Car Dumper Dust Collector	**6.86**	**30.0**	8.9E-07	3.9E-06	3.2E-05	1.4E-04	7.5E-06	3.3E-05	8.9E-06	3.9E-05	Particulate
MDC-2	Transfer Tower #1 Dust Collector	**0.90**	**3.9**	1.2E-07	5.1E-07	4.1E-06	1.8E-05	9.9E-07	4.3E-06	1.2E-06	5.1E-06	Particulate
MDC-3	Transfer Tower #2 Dust Collector	**0.90**	**3.9**	1.2E-07	5.1E-07	4.1E-06	1.8E-05	9.9E-07	4.3E-06	1.2E-06	5.1E-06	Particulate
MDC-4	Crusher Building Dust Collector	**0.99**	**4.3**	1.3E-07	5.6E-07	4.5E-06	2.0E-05	1.1E-06	4.7E-06	1.3E-06	5.6E-06	Particulate
MDC-5	Transfer Tower #3 Dust Collector	**0.90**	**3.9**	1.2E-07	5.1E-07	4.1E-06	1.8E-05	9.9E-07	4.3E-06	1.2E-06	5.1E-06	Particulate
CDC-1	Coal Storage Dome #1 Dust Collector (live storage)	**6.43**	**28.2**	8.4E-07	3.7E-06	3.0E-05	1.3E-04	7.1E-06	3.1E-05	8.4E-06	3.7E-05	Particulate
CDC-2	Coal Storage Dome #2 Dust Collector (live storage)	**6.43**	**28.2**	8.4E-07	3.7E-06	3.0E-05	1.3E-04	7.1E-06	3.1E-05	8.4E-06	3.7E-05	Particulate
CDC-3	Coal Reclaim Hopper #1 Dust Collector	**0.47**	**2.1**	6.1E-08	2.7E-07	2.2E-06	9.5E-06	5.2E-07	2.3E-06	6.1E-07	2.7E-06	Particulate
CDC-4	Coal Reclaim Hopper #2 Dust Collector	**0.47**	**2.1**	6.1E-08	2.7E-07	2.2E-06	9.5E-06	5.2E-07	2.3E-06	6.1E-07	2.7E-06	Particulate
CDC-5	Coal Tripper Floor Unit #1 Dust Collector A	**0.99**	**4.3**	1.3E-07	5.6E-07	4.5E-06	2.0E-05	1.1E-06	4.7E-06	1.3E-06	5.6E-06	Particulate
CDC-6	Coal Tripper Floor Unit #1 Dust Collector B	**0.99**	**4.3**	1.3E-07	5.6E-07	4.5E-06	2.0E-05	1.1E-06	4.7E-06	1.3E-06	5.6E-06	Particulate
CH-1	Coal Unloading Belt Feeder Transfer Point	**0.0000**	**0.0000**	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	Particulate
CH-2	Coal Stockout Conveyor	**0.07**	**0.3**	9.1E-09	4.0E-08	3.2E-07	1.4E-06	7.7E-08	3.4E-07	9.1E-08	4.0E-07	Particulate
CH-3	Active Coal Pile Wind Erosion and Maintenance	**1.94**	**8.5**	2.5E-07	1.1E-06	8.9E-06	3.9E-05	2.1E-06	9.4E-06	2.5E-06	1.1E-05	Particulate
CH-4	Inactive Portion of Coal Pile Wind Erosion	**0.03**	**0.1**	3.4E-09	1.5E-08	1.2E-07	5.2E-07	2.9E-08	1.3E-07	3.4E-08	1.5E-07	Particulate
Total from Coal Handling				**3.7E-06**	**1.6E-05**	**1.3E-04**	**5.7E-04**	**3.1E-05**	**1.4E-04**	**3.7E-05**	**1.6E-04**	

Notes:

1 Hazardous Air Pollutant

2 Data source "Section 313 of the Emergency Planning and Community Right-to-Know Act Toxic Chemical Release Inventory Electric Generating Facilities" EPA 745-B-00-004

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LIMESTONE HANDLING - TOXIC MATERIAL HANDLING EMISSIONS

	Limestone[2]	PM_{10}		Arsenic[1] 2.5 ppm		Barium 2000 ppm		Cadmium[1] 2 ppm		Chromium[1] 500 ppm		Cobalt[1] 5 ppm	
FIN #	Emissions Source Description	lb/ hour	tons/ year	lb/ hour	tons/ year	lb/ hour	tons/ year	lb/ hour	tons/ year	lb/ hour	tons/ year	lb/ hour	tons/ year
New Limestone Handling System:													
LDC-1	Limestone Preparation Building Dust Collector	**0.17**	**0.75**	4.3E-07	1.9E-06	3.4E-04	1.5E-03	3.4E-07	1.5E-06	8.6E-05	3.8E-04	8.6E-07	3.8E-06
LDC-2	Limestone Silo A Dust Collector	**0.06**	**0.26**	1.5E-07	6.6E-07	1.2E-04	5.3E-04	1.2E-07	5.3E-07	3.0E-05	1.3E-04	3.0E-07	1.3E-06
LDC-3	Limestone Silo B Dust Collector	**0.06**	**0.26**	1.5E-07	6.6E-07	1.2E-04	5.3E-04	1.2E-07	5.3E-07	3.0E-05	1.3E-04	3.0E-07	1.3E-06
LDC-4	Limestone Reclaim Tunnel Dust Collector	**0.18**	**0.77**	4.4E-07	1.9E-06	3.5E-04	1.5E-03	3.5E-07	1.5E-06	8.8E-05	3.9E-04	8.8E-07	3.9E-06
LDC-5	Limestone Unloading Building dust collector	**3.21**	**14.08**	8.0E-06	3.5E-05	6.4E-03	2.8E-02	6.4E-06	2.8E-05	1.6E-03	7.0E-03	1.6E-05	7.0E-05
LH-1	Limestone Unloading Conveyor Transfer Point	**0.12**	**0.54**	3.1E-07	1.3E-06	2.4E-04	1.1E-03	2.4E-07	1.1E-06	6.1E-05	2.7E-04	6.1E-07	2.7E-06
LH-2	Limestone Silo A/B Loading Conveyor Transfer Point	**0.04**	**0.17**	9.7E-08	4.2E-07	7.7E-05	3.4E-04	7.7E-08	3.4E-07	1.9E-05	8.5E-05	1.9E-07	8.5E-07
LH-3	Limestone Silo B Loading Conveyor Transfer Point	**0.04**	**0.17**	9.7E-08	4.2E-07	7.7E-05	3.4E-04	7.7E-08	3.4E-07	1.9E-05	8.5E-05	1.9E-07	8.5E-07
LH-4	Limestone Pile Wind Erosion and Maintenance	**1.39**	**6.07**	3.5E-06	1.5E-05	2.8E-03	1.2E-02	2.8E-06	1.2E-05	6.9E-04	3.0E-03	6.9E-06	3.0E-05
Total from Limestone Handling				**1.3E-05**	**5.8E-05**	**1.1E-02**	**4.6E-02**	**1.1E-05**	**4.6E-05**	**2.6E-03**	**1.2E-02**	**2.6E-05**	**1.2E-04**

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LIMESTONE HANDLING - TOXIC MATERIAL HANDLING EMISSIONS

FIN #	Limestone[2] Emissions Source Description	PM_{10}		Copper 10 ppm		Lead[1] 100 ppm		Manganese[1] 1100 ppm		Mercury[1] 1 ppm		Nickel[1] 20.0 ppm	
		lb/ hour	tons/ year	lb/ hour	tons/ year	lb/ hour	tons/ year	lb/ hour	tons/ year	lb/ hour	tons/ year	lb/ hour	tons/ year
New Limestone Handling System:													
LDC-1	Limestone Preparation Building Dust Collector	**0.17**	**0.75**	1.7E-06	7.5E-06	1.7E-05	7.5E-05	1.9E-04	8.3E-04	1.7E-07	7.5E-07	3.4E-06	1.5E-05
LDC-2	Limestone Silo A Dust Collector	**0.06**	**0.26**	6.0E-07	2.6E-06	6.0E-06	2.6E-05	6.6E-05	2.9E-04	6.0E-08	2.6E-07	1.2E-06	5.3E-06
LDC-3	Limestone Silo B Dust Collector	**0.06**	**0.26**	6.0E-07	2.6E-06	6.0E-06	2.6E-05	6.6E-05	2.9E-04	6.0E-08	2.6E-07	1.2E-06	5.3E-06
LDC-4	Limestone Reclaim Tunnel Dust Collector	**0.18**	**0.77**	1.8E-06	7.7E-06	1.8E-05	7.7E-05	1.9E-04	8.5E-04	1.8E-07	7.7E-07	3.5E-06	1.5E-05
LDC-5	Limestone Unloading Building dust collector	**3.21**	**14.08**	3.2E-05	1.4E-04	3.2E-04	1.4E-03	3.5E-03	1.5E-02	3.2E-06	1.4E-05	6.4E-05	2.8E-04
LH-1	Limestone Unloading Conveyor Transfer Point	**0.12**	**0.54**	1.2E-06	5.4E-06	1.2E-05	5.4E-05	1.3E-04	5.9E-04	1.2E-07	5.4E-07	2.4E-06	1.1E-05
LH-2	Limestone Silo A/B Loading Conveyor Transfer Point	**0.04**	**0.17**	3.9E-07	1.7E-06	3.9E-06	1.7E-05	4.3E-05	1.9E-04	3.9E-08	1.7E-07	7.7E-07	3.4E-06
LH-3	Limestone Silo B Loading Conveyor Transfer Point	**0.04**	**0.17**	3.9E-07	1.7E-06	3.9E-06	1.7E-05	4.3E-05	1.9E-04	3.9E-08	1.7E-07	7.7E-07	3.4E-06
LH-4	Limestone Pile Wind Erosion and Maintenance	**1.39**	**6.07**	1.4E-05	6.1E-05	1.4E-04	6.1E-04	1.5E-03	6.7E-03	1.4E-06	6.1E-06	2.8E-05	1.2E-04
Total from Limestone Handling				**5.3E-05**	**2.3E-04**	**5.3E-04**	**2.3E-03**	**5.8E-03**	**2.5E-02**	**5.3E-06**	**2.3E-05**	**1.1E-04**	**4.6E-04**

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LIMESTONE HANDLING - TOXIC MATERIAL HANDLING EMISSIONS

FIN #	Limestone[2] Emissions Source Description	PM_{10}		Selenium[1] 0.1 ppm		Silver 1.0 ppm		Zinc 200.00 ppm		Pollutant Form	Pollutant Class
		lb/ hour	tons/ year	lb/ hour	tons/ year	lb/ hour	tons/ year	lb/ hour	tons/ year		
New Limestone Handling System:											
LDC-1	Limestone Preparation Building Dust Collector	**0.17**	**0.75**	1.4E-08	6.0E-08	1.7E-07	7.5E-07	3.4E-05	1.5E-04	Particulate	Inorganic
LDC-2	Limestone Silo A Dust Collector	**0.06**	**0.26**	4.8E-09	2.1E-08	6.0E-08	2.6E-07	1.2E-05	5.3E-05	Particulate	Inorganic
LDC-3	Limestone Silo B Dust Collector	**0.06**	**0.26**	4.8E-09	2.1E-08	6.0E-08	2.6E-07	1.2E-05	5.3E-05	Particulate	Inorganic
LDC-4	Limestone Reclaim Tunnel Dust Collector	**0.18**	**0.77**	1.4E-08	6.2E-08	1.8E-07	7.7E-07	3.5E-05	1.5E-04	Particulate	Inorganic
LDC-5	Limestone Unloading Building dust collector	**3.21**	**14.08**	2.6E-07	1.1E-06	3.2E-06	1.4E-05	6.4E-04	2.8E-03	Particulate	Inorganic
LH-1	Limestone Unloading Conveyor Transfer Point	**0.12**	**0.54**	9.8E-09	4.3E-08	1.2E-07	5.4E-07	2.4E-05	1.1E-04	Particulate	Inorganic
LH-2	Limestone Silo A/B Loading Conveyor Transfer Point	**0.04**	**0.17**	3.1E-09	1.4E-08	3.9E-08	1.7E-07	7.7E-06	3.4E-05	Particulate	Inorganic
LH-3	Limestone Silo B Loading Conveyor Transfer Point	**0.04**	**0.17**	3.1E-09	1.4E-08	3.9E-08	1.7E-07	7.7E-06	3.4E-05	Particulate	Inorganic
LH-4	Limestone Pile Wind Erosion and Maintenance	**1.39**	**6.07**	1.1E-07	4.9E-07	1.4E-06	6.1E-06	2.8E-04	1.2E-03	Particulate	Inorganic
Total from Limestone Handling				**4.2E-07**	**1.8E-06**	**5.3E-06**	**2.3E-05**	**1.1E-03**	**4.6E-03**		

Notes:

1 Hazardous Air Pollutant

2 Data source "Section 313 of the Emergency Planning and Community Right-to-Know Act Toxic Chemical Release Inventory Electric Generating Facilities" EPA 745-B-00-004

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ASH HANDLING - TOXIC MATERIAL HANDLING EMISSIONS

		PM_{10}		Antimony[1]		Arsenic[1]		Barium		Cadmium[1]		Chromium[1]	
	Fly Ash[2]			131 ppm		6300 ppm		13800 ppm		130 ppm		900 ppm	
	Bottom Ash[2]			10 ppm		168 ppm		9360 ppm		10 ppm		5820 ppm	
FIN #	Emissions Source Description	lb/ hour	tons/ year	lb/ hour	tons/ year	lb/ hour	tons/ year	lb/ hour	tons/ year	lb/ hour	tons/ year	lb/ hour	tons/ year
New Fly Ash Handling System													
ACD-1	Fly Ash Silo 1 Dust Collector	**0.09**	**0.38**	1.1E-05	4.9E-05	5.4E-04	2.4E-03	1.2E-03	5.2E-03	1.1E-05	4.9E-05	7.7E-05	3.4E-04
ACD-2	Fly Ash Silo 2 Dust Collector	**0.09**	**0.38**	1.1E-05	4.9E-05	5.4E-04	2.4E-03	1.2E-03	5.2E-03	1.1E-05	4.9E-05	7.7E-05	3.4E-04
New Bed Ash Handling System													
ACD-3	Bottom Ash Silo 1 Dust Collector	**0.09**	**0.38**	8.6E-07	3.8E-06	1.4E-05	6.3E-05	8.0E-04	3.5E-03	8.6E-07	3.8E-06	5.0E-04	2.2E-03
ACD-4	Bottom Ash Silo 2 Dust Collector	**0.09**	**0.38**	8.6E-07	3.8E-06	1.4E-05	6.3E-05	8.0E-04	3.5E-03	8.6E-07	3.8E-06	5.0E-04	2.2E-03
New Landfill Handling System:													
LF-1	Landfill Inactive Pile Wind Erosion - area 1	**0.0**	**0.0**	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
LF-2	Landfill Inactive Pile Wind Erosion - area 2	**0.0**	**0.0**	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
LF-3	Landfill Inactive Pile Wind Erosion - 5 yr cell	**0.0**	**0.0**	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
LF-4	Landfill Stockout	**0.003**	**0.015**	4.5E-07	2.0E-06	2.2E-05	9.5E-05	4.8E-05	2.1E-04	4.5E-07	2.0E-06	3.1E-06	1.4E-05
LF-5	Landfill Active Pile Wind Erosion and Maintenance	**2.43**	**10.66**	3.2E-04	1.4E-03	1.5E-02	6.7E-02	3.4E-02	1.5E-01	3.2E-04	1.4E-03	2.2E-03	9.6E-03
Total from Ash Handling				**3.4E-04**	**1.5E-03**	**1.6E-02**	**7.2E-02**	**3.8E-02**	**1.6E-01**	**3.4E-04**	**1.5E-03**	**3.3E-03**	**1.5E-02**

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ASH HANDLING - TOXIC MATERIAL HANDLING EMISSIONS

		PM_{10}		Copper		Lead[1]		Manganese[1]		Mercury[1]		Nickel[1]	
		Fly Ash[2]		2200 ppm		2120 ppm		3000 ppm		12.0 ppm		4300 ppm	
		Bottom Ash[2]		932 ppm		1082 ppm		1940 ppm		4.2 ppm		2939 ppm	
FIN #	**Emissions Source Description**	**lb/ hour**	**tons/ year**	**lb/ hour**	**tons/ year**	**lb/ hour**	**tons/ year**	**lb/ hour**	**tons/ year**	**lb/ hour**	**tons/ year**	**lb/ hour**	**tons/ year**
New Fly Ash Handling System													
ACD-1	Fly Ash Silo 1 Dust Collector	**0.09**	**0.38**	1.9E-04	8.3E-04	1.8E-04	8.0E-04	2.6E-04	1.1E-03	1.0E-06	4.5E-06	3.7E-04	1.6E-03
ACD-2	Fly Ash Silo 2 Dust Collector	**0.09**	**0.38**	1.9E-04	8.3E-04	1.8E-04	8.0E-04	2.6E-04	1.1E-03	1.0E-06	4.5E-06	3.7E-04	1.6E-03
New Bed Ash Handling System													
ACD-3	Bottom Ash Silo 1 Dust Collector	**0.09**	**0.38**	8.0E-05	3.5E-04	9.3E-05	4.1E-04	1.7E-04	7.3E-04	3.6E-07	1.6E-06	2.5E-04	1.1E-03
ACD-4	Bottom Ash Silo 2 Dust Collector	**0.09**	**0.38**	8.0E-05	3.5E-04	9.3E-05	4.1E-04	1.7E-04	7.3E-04	3.6E-07	1.6E-06	2.5E-04	1.1E-03
New Landfill Handling System:													
LF-1	Landfill Inactive Pile Wind Erosion - area 1	**0.00**	**0.00**	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
LF-2	Landfill Inactive Pile Wind Erosion - area 2	**0.00**	**0.00**	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
LF-3	Landfill Inactive Pile Wind Erosion - 5 yr cell	**0.00**	**0.00**	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
LF-4	Landfill Stockout	**0.00**	**0.02**	7.6E-06	3.3E-05	7.3E-06	3.2E-05	1.0E-05	4.5E-05	4.1E-08	1.8E-07	1.5E-05	6.5E-05
LF-5	Landfill Active Pile Wind Erosion and Maintenance	**2.43**	**10.66**	5.4E-03	2.3E-02	5.2E-03	2.3E-02	7.3E-03	3.2E-02	2.9E-05	1.3E-04	1.0E-02	4.6E-02
Total from Ash Handling				**5.9E-03**	**2.6E-02**	**5.7E-03**	**2.5E-02**	**8.2E-03**	**3.6E-02**	**3.2E-05**	**1.4E-04**	**1.2E-02**	**5.1E-02**

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ASH HANDLING - TOXIC MATERIAL HANDLING EMISSIONS

		PM_{10}		Selenium[1]		Silver		Vanadium		Zinc		Pollutant	Pollutant
	Fly Ash[2]			134 ppm		36 ppm		1180 ppm		3500 ppm			
	Bottom Ash[2]			14 ppm		9.9 ppm		537.0 ppm		1796 ppm			
FIN #	Emissions Source Description	lb/ hour	tons/ year	lb/ hour	tons/ year	lb/ hour	tons/ year	lb/ hour	tons/ year	lb/ hour	tons/ year	Form	Class
New Fly Ash Handling System													
ACD-1	Fly Ash Silo 1 Dust Collector	**0.09**	**0.38**	1.1E-05	5.0E-05	3.1E-06	1.4E-05	1.0E-04	4.4E-04	3.0E-04	1.3E-03	Particulate	Inorganic
ACD-2	Fly Ash Silo 2 Dust Collector	**0.09**	**0.38**	1.1E-05	5.0E-05	3.1E-06	1.4E-05	1.0E-04	4.4E-04	3.0E-04	1.3E-03	Particulate	Inorganic
New Bed Ash Handling System													
ACD-3	Bottom Ash Silo 1 Dust Collector	**0.09**	**0.38**	1.2E-06	5.3E-06	8.5E-07	3.7E-06	4.6E-05	2.0E-04	1.5E-04	6.7E-04	Particulate	Inorganic/ Organic
ACD-4	Bottom Ash Silo 2 Dust Collector	**0.09**	**0.38**	1.2E-06	5.3E-06	8.5E-07	3.7E-06	4.6E-05	2.0E-04	1.5E-04	6.7E-04	Particulate	Inorganic/ Organic
New Landfill Handling System:													
LF-1	Landfill Inactive Pile Wind Erosion - area 1	**0.00**	**0.00**	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	Particulate	Inorganic
LF-2	Landfill Inactive Pile Wind Erosion - area 2	**0.00**	**0.00**	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	Particulate	Inorganic
LF-3	Landfill Inactive Pile Wind Erosion - 5 yr cell	**0.00**	**0.00**	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	Particulate	Inorganic
LF-4	Landfill Stockout	**0.00**	**0.02**	4.6E-07	2.0E-06	1.2E-07	5.4E-07	4.1E-06	1.8E-05	1.2E-05	5.3E-05	Particulate	Inorganic
LF-5	Landfill Active Pile Wind Erosion and Maintenance	**2.43**	**10.66**	3.3E-04	1.4E-03	8.8E-05	3.8E-04	2.9E-03	1.3E-02	8.5E-03	3.7E-02	Particulate	Inorganic
Total from Ash Handling				**3.5E-04**	**1.5E-03**	**9.6E-05**	**4.2E-04**	**3.2E-03**	**1.4E-02**	**9.4E-03**	**4.1E-02**		

Notes:

1 Hazardous Air Pollutant

2 Data source "Section 313 of the Emergency Planning and Community Right-to-Know Act Toxic Chemical Release Inventory Electric Generating Facilities" EPA 745-B-00-004